

**NEEDLE-FREE JET INJECTION BIBLIOGRAPHY,
DEVICE & MANUFACTURER ROSTER,
and PATENT LIST**

last update: 2004-April-06

(Available at: <http://www.cdc.gov/nip/dev/jetinject.htm#bibliography>)

New or updated entries added since website-posting of 2003-Dec-24:

References: Carter2003, Haupt2003

Devices: GunA, EMS/RPM, EMS/MPM

Patents: US 6063053, 6080130, 6156008, 6223786, 6302160 B2, 6447475 B1,
6474369 B2, 6500239 B2, 6610042 B2, 6613010 B2, 6613011 B2

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Bibliography initiation, 1994-1995 – Lisa Lindsay, Emory Univ.
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Update, April-May, 2002 – Christine Korhonen, Emory Univ.
Barclay1962 – Joanne Penkalski, Academy of Medicine Cleveland/Northern Ohio
Medical Association
Béclard/Galante1866, Galante1866/1885 – Bernadette Molitor & Marie Peyraube,
Bibliothèque Interuniversitaire de Médecine, Paris, France
Linder1979 – Darin Zehrung, PATH, Seattle, Washington
Schön1965 – Urda Guse, Zentrale Hochschulbibliothek, Lübeck, Germany
Spiegel1994a – Philippe Stoeckel, Association pour l'Aide à la Médecine Préventive,
Paris; Betty Dodet, Fondation Mérieux, Lyon, France

Legend:

~R.200#Monday: Reprint copy requested on date indicated.
Double-indented items: Paper copy not yet received or not yet filed.
***ID:** Article on intradermal vaccination but NOT via needle-free injection device.

Kindly please address any additions, updates, corrections, and suggestions to:

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REFERENCES

{Abb1981} Abb J, Deinhardt F, Eisenberg J. The risk of transmission of hepatitis B virus using jet injection in inoculation. *J Infect Dis* August 1981;144(2):176-179.

~R 2003Aug22 {Acheson1986} Acheson D, Poole AAB. Jet Injectors. Chief Medical Officer / Chief Nursing Officer circular 16, 1986. London: Department of Health and Social Services.

{Ackerman1995} Ackerman WE, Kennedy LD. An alternate method for intercostal blockade for the management of post herpetic neuralgia. *J Kentucky Med Assoc.* Feb 1995;93(2):56-58.
[Med-E-Jet®, bupivacaine]

{Agafonov1969} Agafonov VI, Vorob'ev AA, Beliakov VD, Marennikova SS, Shtunderenko GV, Nekrasov IL, Il'chenko AA, Averburg VV, Krasnikov AV, Lukin EP, Gnuchev NN, Vaniushin SP, Akatova-Shelukhina EM, Ishkil'din MI. Opyt provedeniia vaktsinatsii protiv ospy bezygol'nym metodom [Experience in performing vaccination against smallpox by the needleless method]. *Voenno-meditsinskii Zhurnal [Military Medical Journal] (Russia)* Jun 1969;6:48-50.
[Agafonov1969 compared 488 soldiers receiving traditional scarification with 1000 receiving smallpox vaccine with the BIP-4 jet injector. Vaccine “takes” were 98% in BIP-4 group and 93% in scarification group, with no complications observed.
Conclusions: BIP-4 vaccinates 1,500 persons per hour, 23 times faster than scarification method. Vaccination teams should include 1 MD or physician assistant and 2 persons to help clean injection site.]

{Agafonov1970} Agafonov VI, Vorob'ev AA, Nekrasov IL, Lukin EP, Nikonov VA. Tekhnika provedeniia vaktsinatsii bezygol'nym in'ektorom BIP-4 [Technic of carrying out vaccinations with the needleless injector BIP-4]. *Voenno-meditsinskii Zhurnal [Military Medical Journal] (Russia)* Jul 1970;7:51-52.
[Agafonov1970 describe Pneumatic Jet Injector (B I P) BIP-4 device (includes photograph), weighing 1,500 g, using air or nitrogen power, consuming 10 liters per 1000 injections. Accepts 10-100 mL vials. Can be used for ID, SC, or IM injections. 10% of the time a blood droplet appears after injection.]

{Agafonov1972} Agafonov VI, Babkin EI, Vdovin DG, Vorobeichikov VM, Vorobiev AA, Gamieshko KP, Gapochko KG, Gefen NE, Evstigneev VI, Emelyanova OV, Zemskov EM, Imamaliev OG, Kamalov II, Kvirkadze VV, Kutyrev PA, Misnikov OP, Pushkarev VP, Rozhdestvensky DA. Sravnitel'naia kharakteristika proizvoditel'nosti razlichnykh metodov immunizatsii protiv chumy [Comparative characteristics of productiveness of various methods of plague immunization]. *Zh Mikrobiol Epidemiol Immunobiol (Russia)* Nov 1972;49(11):106-112.

[Agafonov1972 compared oral, “aerogenic”, and jet injection (BIP-4) routes of plague vaccine immunization, which each proved to be 10 to 15 times more productive in comparison with subcutaneous and “skin” methods.]

{Agafonov1973} Agafonov VI, Beliakov VD, Ishkil'din MI, Khokhlov DT, Rabinovich IaD. Immunologicheskaya effektivnost' privivok protiv ospy i tularemii bezygol'nyim metodom [Immunological effectiveness of immunization against smallpox and tularemia by the jet injection method]. *Voenno-meditsinskii Zhurnal* [Military Medical Journal] (Russia) Apr 1973;4:48-51

[*Agafonov1973* compared immunogenicity and safety of both needle-free and conventional vaccination routes (needle injection or scarification, respectively) for tularemia and smallpox vaccines. They found comparable safety and immune responses, with titers somewhat higher for jet injection than the conventional route for both vaccines.]

{Agafonov1974} Agafonov VI, Babkin EI, Bulatova TI, Gamleshko GP, Gapochko KG. Bezygol'nyi metod immunizatsii assotsiirovannymi sorbirovannymi vaktzinami [Jet method of immunizing with associated adsorbed vaccines]. *Voenno-meditsinskii Zhurnal* [Military Medical Journal] (Russia) Dec 1974;(12):44-48.

[*Agafonov1974* compared needle and syringe with BI-2 and BI-3 jet injectors in guinea pigs and human cadavers. Guinea pigs showed less tissue damage than with old BIP-4 model. The BI-2 device delivered 1.0 mL doses of typhoid polyanatoxin vaccine (TAB_{te}), botulism toxoid, and/or tetanus toxoid to 1,581 soldiers, while the BI-3 was used for 1001 soldiers. Efficacy was comparable. Reactogenicity was "bearable".

{Agafonov1977} Agafonov VI, Vorobiev AA, Gapochko KG, Marennikova SS, Patrikeev GT, Babkin EI, Litvinova AP, Shenkman LS, Dorokhina TV, Podkuiko VN, Slobodin AZ, Shernoschekov KA, Borodai AP, Emelyanova OV. Sravnitel'naya otsenka sredstv i metodov immunizatsii liudei protiv natural'noi ospy [Comparative assessment of the means and methods of immunizing humans against smallpox]. *Zh Mikrobiol Epidemiol Immunobiol* (Russia) Jun 1977;(6):31-35.

[oral, ID, jet injection]

{Agafonov1978} Agafonov VI, Bulatova TI, Gamleshko KhP, Gapochko KG, Gorodetskiy RD. Effektivnost' kompleksnoi immunizatsii briushnotifoznoi vaktsinoy s poliana-toksinom v sochetanii s chumnym i ospennym antigenam [Effectiveness of comprehensive immunization with typhoid fever vaccine and polyanatoxin in combination with plague and small pox antigens]. *Voenno-meditsinskii Zhurnal* [Military Medical Journal] (Russia) Oct 1978;(10):51-4

[*Agafonov1978* studied immunogenicity of simultaneous administration of typhoid polyanatoxin vaccine via needle-free jet injection, plus oral smallpox, and oral plague vaccines. Immunogenicity was comparable to similar vaccines given by themselves. The frequency of systemic reactions to the typhoid vaccine by needle-free injection was 6.9%, while local reactions were 82% - 93%.]

~R {Agboton1969a} Agboton Y. Colloque sur le contrôle de la rougeole en Afrique Tropicale - Chapitre 8: Les injecteurs sans aiguille DERMO JET et MULTIJET. VIème Journée Médicales de Dakar, 13-18 Janvier 1969.

{Agboton1969b} Agboton Y. Les injecteurs sans aiguilles. II Dermo-Jet et Multijet.

Médecine Afrique Noire 1969;16:33-37.

***ID** {Ajjan1980} Ajjan N, Soulebot JP, Triau R, Biron G. Intradermal immunization with rabies vaccine. Inactivated Wistar strain cultivated in human diploid cells. JAMA 1980 Dec 5;244(22):2528-2531.

{Aksenenko1972} Aksenenko GR. (Russian title pending) [Use of a jet injector in the practice of human immunization] Zh Mikrobiol Epidemiol Immunobiol. Sep 1972;49(9):28-33 (PMID: 4653085).

{AmatoNeto1974} Amato Neto V, Finger H, Gotschlich EC, Feldman RA, de Avila CA, Konichi SR, Laus WC. Serologic response to serogroup C meningococcal vaccine in Brazilian preschool children. Rev Inst Med Trop Sao Paulo, May-Jun 1974;16(3):149-153.
[Ped-O-Jet]

{AmericanDiabetesAssociation1998} American Diabetes Association. Clinical Practice Recommendations 1998: Insulin administration (position statement). Diabetes Care 1998;21(Suppl. 1):s72-s76.

{Anderson1958} Anderson EA, Lindberg RB, Hunter DH. Report of large-scale field trial of jet injection in immunization for influenza. JAMA 1958;167(5):549-552.

{Anonymous 1958} Anonymous. Jet injection. Brit Med J 1958;5093:438.

{Anonymous 1966} Anonymous. Vaccination by Jet. Br Med J December 31, 1966:1610.

{Anonymous 1970} Anonymous. Jet vaccination. Br Med J Oct 10, 1970;4(727):64-5.

{Anonymous 1980} Anonymous. Subcutaneous injections and absorption of insulin [editorial]. Lancet 1980;1:1005-1007.

{Anonymous 1997} Anonymous. Bioject's painless injections [news]. Nat Biotechnol 1997 Feb;15(2):116.

{Anonymous1999} Anonymous. Can jet-injector devices transmit pathogens? J Occup Environ Med 1999 Jul;41(7):533-534.

{Anwer1999} Anwer K; Earle KA; Shi M; Wang J; Mumper RJ; Proctor B; Jansa K; Ledebur HC; Davis S; Eaglstein W; Rolland AP. Synergistic effect of formulated plasmid and needle-free injection for genetic vaccines. Pharm Res 1999 Jun;16(6):889-895.
[Medi-jector]

{Arnbjerg1973} Arnbjerg J, Sonnichsen HV. Lokal, intravenos analgesi [Local, intravenous analgesia]. Nord Vet Med Nov 1973;25(11):575-9.

{Artenstein1971} Artenstein MS, Branche WC Jr, Zimmerly JG, Cohen RL, Tramont EC,

Kasper DL, Harkins C. Meningococcal infections. 3. Studies of group A polysaccharide vaccines. Bull World Health Organ. 1971;45(3):283-6.

{Artus1966} Artus JC. Vaccination de masse par le vaccin souche Rockefeller 17 D au Sénégal. Utilisation des "Ped-o-Jet" [Mass vaccination with the Rockefeller 17 D strain vaccine in Senegal. Use of "Ped-o-Jet"]. Médecine Tropicale (Marseille, France) Sep-Oct 1966;26(5):527-536.

[yellow fever vaccine]

{Assad1972} Assad L, Martins CR, Martins RD, Marcos B. Ação do "Dermo-jet" sobre os tecidos da mucosa gengival [Action of the "Dermo-jet" on the tissues of the gingival mucosa]. Arq Cent Estud Fac Odontol UFMG (Univ Fed Minas Gerais, Belo Horizonte, Brazil) Jan-Dec 1972;9(1):191-200.

{Aylward1995} Aylward B, Lloyd J, Zaffran M, McNair-Scott R, Evans P. Reducing the risk of unsafe injections in immunization programmes. Financial and operational implications of various injection technologies. Bull World Health Organ 1995;73(4):531-540.

{Aylward1996} Aylward B, Kane M, McNair-Scott R, Hu DJ. Model-based estimates of the risk of human immunodeficiency virus and hepatitis B virus transmission through unsafe injections. Intl J Epidemiol 1995;24(2):446-452. [erratum: 1996;25:688]

{Baer1996} Baer CH, Bennett WM, Folwick DA, Erickson RS. Effectiveness of a jet injection system in administering morphine and heparin to healthy adults. American Journal of Critical Care, January 1996;5(1):42-48.

~R-2003Mar24 {Baker1999} Baker AB, Sanders JE. Fluid mechanics of a spring-loaded jet injector. IEEE Transactions Biomechanical Engineering 1999;46:235-242.

{Bakhur1972} Bakhur EA, Naumenko YuI, Spotarenko SS. O vozmozhnosti ispol'zovaniia bezygol'nogo in'ektora Krantsa dlia vvedeniia gamma-globulina [A possibility of using Krantz jet-injector for the administration of gamma globulin]. Zh Mikrobiol Epidemiol Immunobiol (Russia) Oct 1972;49(10):92-96.

[Bakhur1972: The dose accuracy of the Krantz jet injector was determined by weighing on analytical scales. Liquids close to the viscosity of water had 98% accuracy, while more viscid 10% gamma globulin had 93%-94% accuracy. Radioisotope methods found that only 57% of saline and 19% of 10% gamma globulin entered the skin from a 0.1 mL dose. Conclusion: dosage adjustments should be made when injecting serum viscous preparations with this device.]

{Balabaniuk1974} Balabaniuk IV. [Intradermal immunization with smallpox vaccine using a jet injector]. Voенно-meditsinskii Zhurnal [Military Medical Journal] (Russia) June 1974;6:40-41.

{Banker1974} Banker OH. Pneumatic gun fights disease. Hydraulics and Pneumatics

1974;27:92-??.

{Barclay1962} Barclay EM, Hingson RA, Abram LE, Parran T, Taylor HQ. Mass vaccination against smallpox in Liberia. *The Bulletin (Academy of Medicine of Cleveland; predecessor of Cleveland Physician / Cleveland Academy of Medicine Bulletin)*. Feb/Mar 1962;47(8)(“Operation Brother’s Brother supplement to August issue):16-23.

{Bareille1997} Bareille P, MacSwiney M, Albanese A, De Vile C, Stanhope R. Growth hormone treatment without a needle using the Preci-Jet 50 transjector. *Arch Dis Childhood (London)* January 1997;76(1)65-67.

{Barrett1962} Barrett CD. Automated multiple immunization against diphtheria, tetanus and poliomyelitis. *J Sch Health* 1962, 32, 48-50.

[Hypospray®]

{Bartholow1873} Bartholow, Robert. *Manual of Hypodermic Medication*. 2nd ed. Philadelphia: J.B. Lippincott and Company, 1873 (WB 354 B287m 1873).

{Batson1949} Batson HC, Wall R, Landy M. Active immunization against typhoid with the Hypospray jet injector [Abstract M71]. *Abstracts of Papers, 49th General Meeting, The Society of American Bacteriologists, Cincinnati, May 1949, Bacteriological Proceedings* 1949;49:100.

{Bauer1953} Bauer FK, Cassen B, Youtcheff E, Shoop L. Jet injection of radioisotopes. A clinical study comparing needle and jet injection of I¹³¹, K⁴² and Na²⁴. *Am J Med Sci* April 1953;225:374-378.

{Baum1967} Baum J, Ziff M. Use of the hypospray jet injector for intra-articular injection. *Ann Rheum Dis* Mar 1967;26(2):143-145.

{Béclard/Galante1866} Béclard F. Présentation de l'injecteur de Galante, Séance du 18 décembre 1866, Présidence de M. Bouchardat [Presentation of Jet Injector of Galante, H., meeting of 18 December 1866, Monsieur Bouchardat presiding]. Bulletin de l'Académie Impériale de Médecine (France), 1866;32:321-327 [Document accession no. «cote» 90164, La Bibliothèque Interuniversitaire de Médecine (BIUM), l'Université de Paris V - René Descartes].

See FIGURE AT RIGHT =>

[See another image at Galante1866 and Galante1885]

{Benenson1959a} Benenson AS. Mass immunization by jet injection. In: Proceedings of the International Symposium of Immunology, Opatija, Yugoslavia, 28 September - 1 October 1959 (International Committee for Microbiological Standardization, Section of the International Association of Microbiological Societies). Zagreb: Tiskara Izdavackog zavoda Jugoslavenske akademije, 1959, pp. 393-399 [Library of Congress Classification: QW 504 I60p 1959].

~R (2002Jun12)

{Benenson1959b}
Benenson AS, Mandel AD.
Jet injection of vaccines.
Fed. Proc. 1959;18:2187-
????

{Bennett1971a} Bennett CR, Monheim LM. Production of local anesthesia by jet injection. Oral Surg Oral Med Oral Path. 1971;32(4):526-30.

{Bennett1971b} Bennett CR, Mundell RD, Monheim LM. Studies on tissue penetration characteristics produced by jet injection. J Am Dent Assoc September 1971;83(3):625-629.

{Bennett1972a} Bennett CR, Monheim LM. A clinical study of local anesthesia by jet injection. Ariz Dent J. 1972;18(6):16-18, 42.

{Bennett1972b} Bennett CR, Monheim LM. A clinical study of local anesthesia productions by jet injection. J Acad Gen Dent 1972;20(1):30-32.

{Bennett1998} Bennett J, Nichols F, Rosenblum M, Condry J. Subcutaneous administration of midazolam: a comparison of the Bioject jet injector with the conventional syringe and needle.

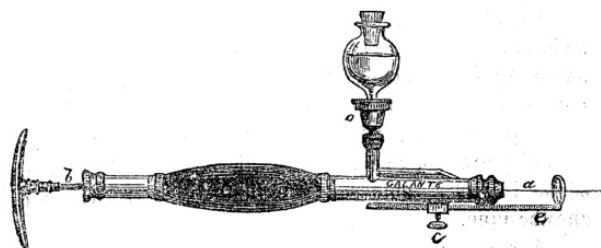
X. M. BÉCLARD présente à l'Académie, de la part de M. Galante, un petit instrument pour pratiquer l'hydro-puncture.

CORRESPONDANCE MANUSCRITE.

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Un jet capillaire de liquide, lorsqu'il est projeté sur un point de la peau et avec la force de vingt-cinq atmosphères au moins, la perce, et le liquide est introduit dans les mailles des tissus organisés.

Il s'agissait de faire un petit instrument qui produisit ce jet et cette force; c'est ce qu'a fait M. le docteur Sales-Girons avec une seringue fabriquée par M. Galante.



Le liquide est contenu dans une petite ampoule de verre; en tirant le piston il entre dans le corps de la pompe, dont le diamètre n'exécède pas 3 millimètres de calibre; en poussant avec le simple effet de la main, il sort un filet capillaire avec la pression voulue de 25 à 30 atmosphères.

Appliqué sur le point désigné de la peau, l'opération de l'hydro-puncture se pratique avec la plus grande facilité. Ce procédé est mis à profit aujourd'hui contre les névralgies rebelles, avec de l'eau pure ou des liquides médicamenteux.

{Béclard/Galante 1866}

J Oral Maxillofac Surg 1998 Nov;56(11):1249-1254.

{Berman1967a} Berman C. Multidose jet injection technic in periodontal curettage procedures. Dental Abstracts June 1967;:333.

{Berman1967b} Berman CL, Kutscher AH, Zegarelli EV, Beube FE. The multidose jet injection technique in conservative periodontal curettage procedures. Military Medicine Feb 1967;132(2):108-109.

{Bernard1956} Bernard JG, Moras P. Un injecteur à haute pression: seringue sans aiguille. Étude histologique de la pénétration transcutanée de suspensions microbiennes [High-pressure injector: needle-free syringe. Histologic study of transcutaneous penetration of microbial suspensions]. Bull. Doc. Méd. Française 1956;4:91-94.

* {Bernard1982} Bernard KW, Roberts MA, Sumner J, Winkler WG, Mallonee J, Baer GM, Chaney R. Human diploid cell rabies vaccine. Effectiveness of immunization with small intradermal or subcutaneous doses. JAMA 1982 Feb 26;247(8):1138-42.

{Berry1981} Berry RB. A comparison of spring and CO₂-powered needleless injectors in the treatment of keloids with triamcinolone. Br J Plast Surg 1981;34(4):458-461.

{Bettag1967} Bettag OL, Hall C. Mantoux tuberculin testing - Standard method vs. jet injection. Diseases of the Chest May 1967;51(5):530-536.

{Binkin1982} Binkin N, Band J. Epidemic of meningococcal meningitis in Bamako, Mali: epidemiological features and analysis of vaccine efficacy. Lancet 1982;2:315-318.

{Bioject1999} Bioject Annual Report. 1999. Portland, Oregon: Bioject, Inc. 12 pp.

{Black1978} Black J, Nagle CJ, Strachan CHL. Prophylactic low-dose heparin by jet injection. Br Med J 8 July 1978;2(6130):95.

~R 2003Aug22 {Bogenrieder2003} Bogenrieder T, Lehn N, Landthaler M, Stolz W. Treatment of old world cutaneous leishmaniasis with intralesionally injected meglumine antimoniate using a Dermojet device. Dermatology 2003;206:269-272.

{Boisvert1966} Boisvert M, Drolet H. Painless injections. Canadian Med Assoc Journal 1966;94:1280.

{Bonner1973} Bonner CD. Dermo-Jet [letter]. Arch Phys Med Rehabil Nov 1973;54(11):537-538.

[clogging with precipitate]

{Boyer-Chuanroong19??} Boyer-Chuanroong L. No-needle injector vs. traditional syringe: points to consider in decision making. Hepatitis B Project Manager/School District Nurse, San

Francisco Unified School District. Portland, OR: Bioject Corporation, undated document.
{Bremseth2001} Bremseth DL, Pass F. Delivery of insulin by jet injection: recent observations. *Diabetes Technol. Ther.* 2001;3(2):225-232.

{Brés1969} Brés P, Robin Y. Les injecteurs sans aiguille I. Ped-O-Jet. Considérations particulières à son emploi pour la vaccination [Needle-free injectors - I. Ped-O-Jet. Specific considerations on their use for vaccinations]. *Médecine Afrique Noire* 1969;16:29-31.

{Brink1985} Brink PRG, van Loon AM, Trommelen JCM, Gribnau FWJ, Smale-Novakova IRO. Virus transmission by subcutaneous jet injection. *J Med Microbiol.* December 1985;20(3):393-397.

{British Thoracic and Tuberculosis Association 1971} British Thoracic and Tuberculosis Association Research Committee (Jet Injection Subcommittee: Griffiths M, et al.) A comparison of intradermal BCG vaccination by jet injection and by syringe and needle. *Tubercle* 1971;52:155-165.

[Panjet, "Intrajet"]

{Brodell1995} Brodell RT, Bredle DL. The treatment of palmar and plantar warts using natural alpha interferon and a needleless injector. *Dermatol Surg* 1995 Mar;21(3):213-8.

{Brólio1976} Brólio R, Veronesi R, Mazza CC, Feldman C, Focaccia R, Cardoso Alves HA. Viabilidade da aplicação do teste tuberculínico com o dermo-jet [Value of the tuberculin test applied with the Dermo-jet]. *Rev Saúde Publica (Brazil)* 1976 Sep;10(3):219-226.

[Dermojet; 40% JI reactor rate, vs. 61% with needle-syringe]

{Brown1949} Brown RV. Evaluation of certain dangers in the use of jet injection technic. *Proc Soc Exper Biol Med* 1949;70:507-509.

{Budd1967} Budd MA, Scholtens RG, McGehee RF Jr, Gardner P. An evaluation of measles and smallpox vaccines simultaneously administered. *Am J Public Health Nations Health.* Jan 1967;57(1):80-86.

[Ped-O-Jet]

{Burgasov1973} Burgasov PN, Cherkasskii BL, Adilov DA, Knop AG, Savinykh AI. (Russian title pending) [Immunitization against anthrax by a needleless method]. *Zh Mikrobiol Epidemiol Immunobiol.* Aug. 1973;50(8):23-26 (PMID: 4784586).

{Burgasov1974} Burgasov PN, Gigauri VS, Smoliarov BV. Konstruktsiia, povyshaiushchaia kachestvo raspredeleniia veshchestva pri bezygol'nykh in"ektsiakh [Design to improve the spread of the substance in jet injections]. *Zh Mikrobiol Epidemiol Immunobiol* Dec 1974;(12):59-62.

[*Burgasov1974*: Studied 120 jet injections on cadavers, animals, and humans using a subcutaneous (SC) nozzle which directed the jet parallel to the skin. SC deposition was confirmed by x-ray. The nozzle design permitted increased orifice size and extended to area of applied pressure.]

- {Burgasov1976} Burgasov PN, Cherkasskii BL, Knop AG, Utegenov KU. Epidemiologicheskaya effektivnost' sibiriazvennoi vaksiny STI [Epidemiologic effectiveness of anthrax vaccine STI] Zh Mikrobiol Epidemiol Immunobiol. Sep 1976;(9):27-35 (PMID: 1015076).
- {Burkoth1999} Burkoth TL, Bellhouse BJ, Hewson G, Longridge DJ, Muddle AG, Sarphie DF. Transdermal and transmucosal powdered drug delivery. Crit Rev Ther Drug Carrier Syst 1999;16(4):331-384.
- {Cal/OSHA1999} Cal/OSHA Consultation Service. Safety Needles and Needleless Systems: Bloodborne Pathogens Regulation Changes. San Francisco, CA: California Department of Industrial Relations, July 1999. (<http://www.dir.ca.gov/DOSH/consultation.html>)
- {Calafiore1966} Calafiore DC, Nader PR, Lepow ML, Nankervis GA, Casey H, Warren RJ. Attenuated measles virus vaccine dosage study -- Cleveland Ohio, 1966. Am J Epidemiology January 1968;87(1):247-53.
- {Calvert1966} Calvert JW. The Dermo-Jet: two practical uses. Dermatologia Internationalis Apr-Jun 1966;5(2):84.
- {Canter1990} Canter J, Mackey K, Good LS, Roberto RR, Chin J, Bond WW, Alter MJ, Horan JM. An outbreak of hepatitis B associated with jet injections in a weight reduction clinic. Arch Intern Med 1990;150:1923-1927.
- {Carnus1973} Carnus H. Ped-o-jet et viabilité du BCG [Ped-O-Jet and the viability of BCG]. Médecine Tropicale (Marseille) 1973;33:20-23.
- {Carnus1974} Carnus H. Influence du Ped-o-jet sur la viabilité du vaccin BCG intradermique lyophilisé: étude au laboratoire [Influence of Ped-O-Jet on the viability of lyophilized BCG intradermal vaccine: a laboratory study]. Bull World Health Organ 1974;51(1):101-102.
- {Carpenter1965} Carpenter CL, Jolly HW Jr, Reed RJ. Dermojet histopathological artifacts. Arch Dermatol 1965;92:304.
- {Carter2003} Carter EW, Kerr DE. Optimization of DNA-based vaccination in cows using green fluorescent protein and protein A as a prelude to immunization against staphylococcal mastitis. J Dairy Sci. 2003 Apr;86(4):1177-1186.
[Ped-O-Jet®, LectraJet®; see also project no. VT-AS-00608 at <http://www.uvm.edu/vtaes/vthatch.htm>.]
- {Cartier2000} Cartier R, Ren SV, Walther W, Stein U, Lewis A, Schlag PM, Li M, Furth PA. *In vivo* gene transfer by low-volume jet injection. Anal Biochem 2000;282:262-265.
[Biojector® 2000, Ped-O-Jet®, GunA, EMS/RPM, EMS/MPM]
- {CDC1966} National Communicable Disease Center. Current trends measles – 1966: Detroit,

Michigan. Morbidity Mortality Weekly Report. 29 October 1966;15:369-370.

[170,000 Detroit metropolitan area children 1-12 years of age were immunized in 200 inoculation centers in one day (23 October), the largest concentrated measles campaign to date in U.S. history. This Detroit campaign was reported elsewhere (Kogan1968) to have used jet injectors to achieve this rate.)

{CDC1982} Centers for Disease Control. A continuing measles outbreak among school-age children despite an outbreak-control program with school exclusion — Pennsylvania. Morb Mort Wkly Rep 1982;31(25):344-346.

{CDC1985} Centers for Disease Control. Suboptimal response to hepatitis B vaccine given by injection into the buttock. Morb Mort Wkly Rep 1985;34:105-108,113.

{CDC1986} Centers for Disease Control. Hepatitis B associated with jet gun injection - California. Morb Mortal Wkly Rep 1986;35(23):373-376.

{CDC1994} Centers for Disease Control and Prevention. General Recommendations on Immunization: Recommendations of the Advisory Committee on Immunization Practices (ACIP). Morb Mortal Wkly Rep January 28, 1994, 43(RR-1), 7-8

{CDC-WHO1996} Centers for Disease Control and Prevention. Statement by participants [on the use of multiple-use nozzle jet injectors for immunization]. Meeting on Jet Injectors for Immunization: Current Practice and Safety; Improving Designs for the Future (sponsored by CDC and WHO), 2-4 October 1996, Atlanta, pp. 1-2.

{CDC2002} Centers for Disease Control and Prevention. General Recommendations on Immunization: Recommendations of the Advisory Committee on Immunization Practices (ACIP) and the American Academy of Family Physicians (AAFP). Morb Mortal Wkly Rep February 8, 2002;51(No. RR-2):1-35.

[sections on Jet Injection (pp12-13) and Occupational Safety Regulations (p 15); references 64-87 (pp. 30-31)]

~R {Chambon1968} Chambon L, Brés P, Sarrat H. Utilisation d'un injecteur sous pression type «Ped O Jet» pour la vaccination BCG intradermique. Procès-verbal de la 3^e conférence technique de l'OCEAC [Organisation de Coordination pour la Lutte Contre les Grandes Endémies en Afrique Centrale], 24 - 27 January 1968, Yaoundé, OCEAC édit., pp. 446-453.

{Chambon1970a} Chambon L, Barme M, Tommasi U-B, Bres P, Gauthier M. Étude de l'utilisation d'un injecteur sans aiguille pour la vaccination B.C.G. intradermique [The use of an injector without needle for intradermal BCG vaccination]. Médecine Tropicale (Marseille) Nov-Dec 1970;30(6):809-828.

[Ped-O-Jet]

{Chambon1970b} Chambon L, Barme M, Tommasi UB, Bres P, Gauthier M. Étude de l'utilisation d'un injecteur sans aiguille pour la vaccination B.C.G. intradermique [The use of an

injector without needle for intradermal BCG vaccination]. Geneva: World Health Organization, document WHO/TB/70.83, 1970.

[Ped-O-Jet]

{Chambon1970c} Chambon L, Tommasi UB, Barme M, Robin Y, Breul D, Brès P, Heym C. Vaccination associée BCG-fièvre jaune avec un injecteur du type Ped-O-Jet [BCG and yellow fever vaccination with a Ped-O-Jet injector]. X^e Conférence Techn. OCCGE (Organisation de Coopération et de Coordination pour la Lutte Contre les Grandes Endémies), 20-24 April 1970, Bobo-Dioulasso, vol. I, pp. 282-288.

{Chen2003} Chen D, Endres R, Maa Y-F, Kensil CR, Whitaker-Dowling P, Trichel A, Youngner JS, Payne LG. Epidermal powder immunization of mice and monkeys with an influenza vaccine. *Vaccine* 2003;21:2830-2836.

{Cherkasov1992} Cherkasov VA, Stepanov SA. Ispol'zovanie vnutrilegochnykh igol'no-struinykh in"ektsii khimiopreparatov v predoperatsionnykh podgotovke bol'nykh tuberkulezom legkikh [The use of intrapulmonary needle-jet injections of chemical preparations in the preoperative management of patients with pulmonary tuberculosis]. *Probl Tuberk (Russia)* 1992;(9-10):25-28 (UI: 93096797, PMID: 1461898).

{Cherkasskii1973} Cherkasskii BL, Dzharylgasov SA, Skliarov VIa, Neliapin NM, Naumenko IuI. (Russian title pending) [The feasibility of using jet injector BIP-4 for immunization of laboratory animals with STI anthrax vaccine]. *Zh Mikrobiol Epidemiol Immunobiol.* 1973 Oct;50(10):20-3 (PMID: 4207093).

{Chiasson1984} Chiasson JL, Ducros F, Poliquin-Hamet M, Lopez D, Lecavalier L, Hamet P. Continuous subcutaneous insulin infusion (Mill-Hill Infuser) versus multiple injections (Medi-Jector) in the treatment of insulin-dependent diabetes mellitus and the effect of metabolic control on microangiopathy. *Diabetes Care* Jul-Aug 1984;7(4):331-7.

{Chippaux1998} Chippaux JP, Soula G, Campagne G, Rey M. Optimiser la riposte aux épidémies de méningite à méningocoque: rapport d'un atelier d'experts réunis au CERMES (12 au 14 janvier 1998, Niamey, Niger). *Cahiers Santé* 1998;8:245-248.

{Chobert1960} Chobert A, Brion, Fontaine. Injections intradermiques et transcutanées sans aiguille. Présentation d'un appareil. *Bulletin de l'Académie Vétérinaire de France* November 1960;33(9):507-512. ?Vol.23?

{Chobert19##} Chobert, André. Un injecteur a pression sans aiguille. Ses applications en médecine vétérinaire. Thèse, docteur vétérinaire. ??Faculté??

{Ciupe1973} Ciupe M, Racasan R, Muresan IM. Cercetari privind imunizarea antivariolica prin inoculare intradermica [Studies of smallpox immunization by intradermal inoculation]. *Stud Cercet Virusol (Romania)* 1973;24(6):447-51

{Clark1965} Clark ML, Reinhardt H, Miller MC, Wilson R. Polyvalent influenza vaccine:

comparison of jet injection with intradermal and subcutaneous syringe methods of administration. *Journal of Laboratory and Clinical Medicine*. 1965;66:34-41.

{Clarke1975} Clarke AK, Woodland J. Comparison of two steroid preparations used to treat tennis elbow, using the Hypospray. *Rheumatol Rehabil* 1975 Feb;14(1):47-49.

*ID {Clasener1967} Clasener HAL, Beunders BJW. Immunization of man with typhoid and cholera vaccine. Agglutinating antibodies after intracutaneous and subcutaneous injection. *Journal of Hygiene (Cambridge)* 1967;65:449-456.

{Cockburn1965} Cockburn TA, Witt MT, Ludlow CE, Macleod KIE. A comparison of jet injection with the mantoux test in mass skin testing with tuberculin. *Am Rev Respir Dis* July-December 1965;92:982-985.

{Cockshot1982} Cockshot WP, Thompson GT, Howlett LJ, Seeley ET. Intramuscular or intralipomatous injections? *New Engl J Med* 1982;307:356-358.
[inaccuracy of deposition with needle injection]

{Cohen1972} Cohen IS, Lerner AB. Limitations in the use of the Dermo-Jet. *Arch Dermatol* 1972 May;105(5):760.
[Dermo-Jet, triamcinolone acetonide, perforation buccal mucosa]

{Cohn1972} Cohn ML, Chez RA, Hingson RA, Szulman AE, Trimmer M. Use of jet insulin injection in diabetes mellitus therapy. *Diabetes* 1972;21:39-44.

{Cohn1974} Cohn ML, Hingson RA, Narduzzi JV, Seddon JM. Clinical experience with jet insulin injection in diabetes mellitus therapy: a clue to the pathogenesis of lipodystrophy. *Ala J Med Sci* 1974;11:265-272.

{Collas1973} Collas R, Wright J. Vaccination par le BCG au moyen d'un injecteur sous pression sans aiguille (Ped-O-Jet) [BCG vaccination by means of a needle-less pressure injector (Ped-O-Jet)]. Geneva: World Health Organization, document WHO/TB/73, 1973.

{Conry1999} Conry RM; Khazaeli MB; Saleh MN; Allen KO; Barlow DL; Moore SE; Craig D; Arani RB; Schlom J; LoBuglio AF. Phase I trial of a recombinant vaccinia virus encoding carcinoembryonic antigen in metastatic adenocarcinoma: comparison of intradermal versus subcutaneous administration. *Clin Cancer Res* Sep 1999;5(9):2330-2337.

{Consoli1984} Consoli A, Capani F, La Nava G, Nicolucci A, Prosperini GP, Santeusanio G, Sensi S. La somministrazione di insulina umana semisintetica tramite iniettore a spruzzo. [Administration of semisynthetic human insulin by a spray injector]. *Bollettino della Societa Italiana di Biologia Sperimentale* 1984;60:1859-1862.

{Cooke1980} Cooke ED, Bowcock SA, Johnston A, Elliott AT. Gas-powered jet injection compared with conventional methods of injection using lignocaine and technetium-99^m. *Brit Med J* 1980;281:643-645.

{CooperC1966} Cooper C, Morley DC, Weeks MC, Beale AJ. Administration of measles vaccine by Dermojet. *Lancet* 14 May 1966;1(7446):1076-1077.

{CooperJA2000} Cooper JA, Bromley LM, Baranowski AP, Barker SGE. Evaluation of a needle-free injection system for local anaesthesia prior to venous cannulation. *Anaesthesia* 2000;55:247-250.

{Croitoru1987} Croitoru M, Dimache G, Ciordas C, Mihailescu R, Durbaca S, Stoean C. Studiu experimental asupra componentei tifoidice in vaccinarea mixta antitifoidica, antitetanica si antivariolica pe cale intradermica [Experimental study on the typhoid component in mixed intradermal typhoid, tetanus and smallpox vaccination]. *Rev Ig [Bacteriol]* Oct-Dec 1987;32(4):325-330.
[Dermo-jet]

***ID** {Croitoru1988} Croitoru M, Dimache G, Mihailescu R, Velea V, Durbaca S, Stoean C. Behaviour of the typhoid vaccine intradermally administered in association with tetanus unadsorbed vaccine and soluble antigens of vaccinia virus. *Arch Roum Pathol Exp Microbiol (Romania)* Apr-Jun 1988;47(2):139-143.

{Cui2003} Cui Z, Baizer L, Mumper RJ. Intradermal immunization with novel plasmid DNA-coated nanoparticles via a needle-free injection device. *J Biotechnol* 2003;102(2):105-115.

{Cunningham1965} Cunningham, AI. A secondary school immunization program using Hypospray. *Can J Public Health* 1965;56:347-348

{Danowski1978} Danowski TS, Sunder JH. Jet injection of insulin during self-monitoring of blood glucose. *Diabetes Care* 1978;1:27-33.
[Syrijet]

{Darlow1970} Darlow HM. Jet vaccination. *Br Med J* Nov 28, 1970;4(734):554.

{Davies1969} Davies JW, Simon WR. Antibody response to influenza immunization by jet injection. *Canadian J Public Health* 1969;60:104-108.

{Davis1994} Davis HL, Michel M-L, Mancini M, Schleef M, Whalen RG. Direct gene transfer in skeletal muscle: plasmid dna-based immunization against the hepatitis B virus surface antigen. *Vaccine* 1994, 12(16), 1503-1509.
[Biojector]

{Davis2001} Davis L. In-office anesthesia without use of needles. Conference Coverage, Medscape from WebMD, 2001 (webpage review of Wilson2001)
[\[http://www.medscape.com/viewarticle/420894\]](http://www.medscape.com/viewarticle/420894).

{Delemarre-VandeWaal1995} Delemarre-Van de Waal HA, Houdijk ECAM, Herdes E. Experience with a needle-free device to administer growth hormone subcutaneously in growth

hormone deficient patients [abstract 241]. *Hormone Research* 1995;(Suppl 44):61.
[Medi-Jector®]

{deMoraes1994} de Moraes JC, Leon ME, Souza VA, Pannuti C, Trivisanello C, Halsey NA, de Quadros CA. Intradermal administration of measles vaccines. *Bull Pan Am Health Organ* 1994;28(3):250-255.

{DePartearroyo1966} De Partearroyo R, Ruiz Benítez G. Consideraciones sobre el tuberculino-diagnóstico. Estudio comparativo del Mantoux y la jeringuilla Dermo-Jet [Considerations on the diagnostic tuberculin test. Comparative study of the Mantoux test and the Dermo-jet syringe]. *Rev Clin Esp (Spain)* 31 Jan 1966;100(2):119-125.

{deRizzo1982} de Rizzo E, Cardoso BS, Lascalla DL, Tuchija HN, Mendes IF. The jet injection apparatus (Ped-O-Jet) for use in mass vaccination against measles -- an effective procedure for its disinfection. *Rev Inst Med Trop São Paulo* 1982;24(5):263-267.

{deSouzaBrito1996} de Souza Brito G, Chen RT, Stefano IC, Campos AM, Oselka G. The risk of transmission of HIV and other blood-born diseases via jet injectors during immunization mass campaigns in Brazil. 10th International Conference on AIDS, Yokohama, 7-12 August 1994;10(1):301 (abstract no. PC0132, <http://www.aegis.com/conferences/10wac/pc0132.html>) .

{Degano1998} Degano P, Sarphie DF, Bangham CRM. Intradermal DNA immunization of mice against influenza A virus using the novel PowderJect(r) system. *Vaccine* 1998 Feb;16(4):394-8.

{Denne1992} Denne JR, Andrews KL, Lees DV, Mook W. A survey of patient preference for insulin jet injectors versus needle and syringe. *Diabetes Educ* May/June 1992;18(3):223-227.

{Dick1966} Dick G. Combined vaccines. *Canadian J Public Health* 1966;57:435-446.

{Dimache1977} Dimache G, Dimache V, Ciudin L, Palade R, Croitoru M. Intradermal typhoid vaccination in men by jet-injector. Immunological estimation by laboratory tests. *Arch Roum Pathol Exp Microbiol (Bucharest)* Jul-Dec 1977;36(3-4):227-232.

***ID** {Dimache1981} Dimache G, Dimache V, Pavel A, Croitoru M. Intradermal versus subcutaneous typhoid vaccination. *Arch Roum Path Exp Microbiol (Bucharest)* 1981;40:143-148.

{Dimache1982} Dimache G, Croitoru M, Nicolae IN. Subcutaneous versus intradermal typhoid vaccination by Jet-injector apparatus. *Arch Roum Path Exp Microbiol (Bucharest)* 1982;41:259-264.

{Dimache1983} Dimache G, Croitoru M, Dimache V, Cuteanu I, Vasilescu T. Lyophilized typhoid vaccine for intradermal use. *J Biol Standard* 1983;11:261-269.

{Dimache1984} Dimache G, Croitoru M, Ciordas C, Stoean C, Durbaca S, Macovei A, Baluta

M. Efficacy of tetanus toxoid administered by intradermal route in association with typhoid vaccine. Arch Roum Path Exp Microbiol (Bucharest) 1984;43:61-69

~R ?? *ID ?? {Dimache1985} Dimache G, Stoean C, Croitoru M, Durbaca S, Lascu N, Ciordas C, Velea V, Nicolae IN. Efficacy of mixed antityphoid and antitetanus vaccination by intradermal route under pressure. National Session of Immunology (Romania), Cluj, 1985:207-???.
[ARTICLE NOT YET CONFIRMED AS "NEEDLE-FREE"]

{Dimache1986a} Dimache G. The comparative effectiveness, under epidemic conditions, of the intradermal versus subcutaneous antityphoid vaccination estimated by epidemiological surveillance and laboratory tests. Zentralbl Bakteriell Mikrobiol Hyg Aug 1986;262(2):220-229.

{Dimache1986b} Dimache G, Croitoru M, Ciorda C, Velea V. Evolution of the typhoid immunity along one year after intradermal vaccination. Arch Roum Path Exp Microbiol (Bucharest) April-June 1986;45(2):147-152.

{Dimache1990} Dimache, G. The use of jet injector-type apparatus in vaccination. Utilizarea aparatelor de tip jet-injector in vaccinare. Riscul transmiterii unor agenti infectiosi prin jet sub presiune [The risk of the transmission of infectious agents via a jet under pressure]. Rev IG Bacteriol April-June 1990, 35(2), 169-181.

{Dimache1991a} Dimache G, Stoean C, Durbaca S, Croitoru M, Velea V, Mihailescu M, Dimache A. Intradermal antitetanic-antityphoid booster by jet injection. Roum Arch Microbiol Immunol (Romania) Apr-Jun 1991;50(2):117-125.

{Dimache1991b} Dimache G, Croitoru M, Velea V, Stoean C, Durbaca S, Mihailescu M, Dimache A. Intradermal antityphoid-antitetanus vaccination by jet injection. Roum Arch Microbiol Immunol (Romania) Apr-Jun 1991;50(2):127-136.

{Dimache1997} Dimache G, Croitoru M, Balteanu M, Butur D, Negu A, Dimache A, Paul F, Barbu A, Velea L, Alexandrescu V, Isacu F. A clinical, epidemiological and laboratory study on avoiding the risk of transmitting viral hepatitis during vaccinations with the Dermojet protected by an anticontaminant disposable device. Vaccine 1997;15(9):1010-1013.

{DiopMar1971a} Diop Mar I, Sarrat H, Robin Y, Toure M, Rey M. Vaccination anticholérique par voie intradermique au Ped-O-Jet [Intradermal cholera vaccination using Ped-O-Jet]. Bulletin de la Société Médicale d'Afrique Noire de Langue Française 1971;16(2):196-200

{DiopMar1971b} Diop Mar I, Sarrat H, Robin Y, Touré M, Rey M, Bergeret C. Vaccination anticholérique par voie intradermique au Pedojet. Réponse clinique et immunologique (d'après une expérience sénégalaise) [Anticholera vaccination by means of the intradermal Ped-O-Jet. Clinical and immunologic response (results of a Senegalese experience)]. Bull Soc Pathol Exot Filiales. Sep-Oct 1971;64(5):663-672.

{Dodson1997} Dodson, K. Risk of blood-borne pathogen transmission for jet injectors and needles and syringes in parenteral immunizations and a comparison of the direct and indirect costs associated with their use. (Report submitted in partial fulfillment for the degree of Master of Public Health). Atlanta: Department of International Health, Rollins School of Public Health, Emory University, August, 1997:1-43.

{Domino1997} Domino EF, Zsigmond EK, Kovacs V, Fekete G, Stetson P. A new route, jet injection for anesthetic induction in children - III. Ketamine pharmacokinetic studies. *Int J Clin Pharmacol Ther* 1997;35:527-530.

{Domino1998} Domino EF, Zsigmond EK, Kovacs V, Fekete G, Stetson P. A new route, jet injection for anesthetic induction in children: i.v. midazolam drug levels. *Int J Clin Pharmacol Ther* 1998;36:458-462.

{Donchenko1979} Donchenko AS, Maier VV. Bezygol'nye in"ektory pri tuberkulinizatsii skota [Jet injectors for administering tuberculin to cattle]. *Veterinariia (Russia)* Sep 1979;(9):16.
[Russian. NOT ON FILE]

{Dorr2003} Dörr HG, Zabransky S, Keller E, Otten BJ, Partsch CJ, Nyman L, Gillespie BK, Lester NR, Wilson AM, Hyrén C, van Kuijk MA, Schuld P, Schoenfeld SL. Are needle-free injections a useful alternative for growth hormone therapy in children? Safety and pharmacokinetics of growth hormone delivered by a new needle-free injection device compared to a fine gauge needle. *J Pediatr Endocrinol Metab.* 16(3):383-92, 2003 Mar.
[Genotropin® ZipTip™]

{Dreyer1969} Dreyer CV, Winter CC. Use of the dermojet in urology. *Ohio State Med J* Mar 1969;65(3):254-255.

{Dreyer1970} Dreyer CV, Winter CC. Applications of the Dermo-Jet in urology. *J Urol* 1970 Oct;104(4):586-590.

{Duckworth1998} Duckworth GM, Millward HR, Potter CD, Hewson G, Burkoth TL, Bellhouse BJ. Oral PowderJect: a novel system for administering local anaesthetic to the oral mucosa. *Br Dent J* 28 Nov 1998;185(10):536-539.

{Dull1968} Dull, H.B., Herring, L.L., Calafiore, D., Berg, G., and Kaiser, R.L. Jet Injector Tuberculin Skin Testing: Methodology and Results. *Am Rev Respir Dis* 1968, 97, 38-45

{Dunne1954} Dunne B, Cassen B. Some phenomena associated with supersonic liquid jets. *J Appl Physics*, May 1954;25:569-572.

{Dupre1983} Dupre J. Insulin therapy: progress and prospects. *Hospital Practice (office edition)*, Nov 1983;18(11):172-179.

{Dyment1978} Dyment PG, Doering EJ, McHugh MJ. Safety and efficacy of jet anesthesia for bone marrow aspirations. *Blood* 1978;52(3):578-80.

{Edwards1974} Edwards EA, Johnson DP, Pierce WE, and Peckinpaugh RO. Reactions and serologic responses to monovalent acetone-inactivated typhoid vaccine and heat-killed TAB when given by jet injection. *Bull World Health Organ* 1974;51:501-505.

{Edwards1984} Edwards EK, Kowalczyk AP. Unusual pigmentation resulting from the use of an intradermal air-propulsion apparatus. *Int J Dermatol* 1984;23:281-???

~R 2002Aug6 {Ehregut1977} Ehregut W, Allerdist H, Erdmann G. Clinical reactions to an adsorbed killed trivalent influenza vaccine (including A/New Jersey 8/76 antigen) with different immunization methods. *Dev Biol Stand.* 1 June 1977;39:283-287.

{Eidson1976} Eidson CS, Kleven SH. Vaccination of chickens against Marek's disease with the turkey herpesvirus vaccine using a pneumatic vaccinator. *Poult Sci* 1976 May;55(3):960-969.

{ElGeneidy1974} ElGeneidy AK, Bloom AA, Skerman JH, and Stallard RE. Tissue Reaction to Jet Injection. *Oral Surg* October 1974;38(4):501-511.

{Elisberg1956} Elisberg BL, McCown JM, Smadel JE. Vaccination against smallpox. Jet injection of chorio-allantoic membrane vaccine. *J Immunol* 1956;77(5):340-351.

{Ellis1993} Ellis GL, Owens A. The efficacy and acceptability of using a jet injector in performing digital blocks. *Am J Emerg Med* 1993;11:648-650.
[Syri-Jet]

{Epstein1971} Epstein S. Pressure injection of local anesthetics: clinical evaluation of an instrument. *J Am Dent Assoc* 1971;82(2):374-7.

{Evstigneev1994} Evstigneev VI, Lukin EP. K voprosu o bezopasnosti struinoi (bezygol'noi) in"ektsii [The safety of the jet (needle-free) injection]. *Voenno-meditsinskii Zhurnal [Military Medical Journal]* (Russia) Jul 1994;(7):38-39,79 (UI: 95109102, PMID: 7810112).

{Feinman1984} Feinman SV, Berris B, Guha A, Sooknanan R, Bradley DW, Bond WW, Maynard JE.. DNA: DNA hybridization method for the diagnosis of hepatitis B infection. *J Virol Methods* 1984;8(3):199-206.

[In this dilution study, blood from an HBV-carrier patient infected a chimpanzee at a dilution of 10^{-8} , which formed the basis for using 10 pL volume of blood as the minimal chimpanzee-infectious-dose for hepatitis B virus. Mid-1980s hybridization methods could not detect HBV DNA in smaller volumes of blood.]

{Feltquate1997} Feltquate DM, Heaney S, Webster RG, Robinson HL. Different T helper cell types and antibody isotypes generated by saline and gene gun DNA immunization. *J Immunol* 1997;158:2278-84.

{Fenner1988} Fenner F, Henderson DA, Arita I, Je)ek Z, Ladnyi ID. *Chapter 9. Development of the global smallpox eradication programme, 1958-1966* (pp. 365-419; particularly p. 406); *Chapter 11. Smallpox vaccine and vaccination in the intensified smallpox eradication programme* (pp. 539-592; particularly pp. 573-580); *Chapter 12. South America* (pp. 593-625; particularly pp. 600-622); *Chapter 13. Indonesia* (pp. 627-657; particularly p. 641); *Chapter 17. Western and Central Africa* (pp. 849-909). In: *Smallpox and its Eradication*, Geneva: World Health Organization, 1988 (ISBN 92 4 156110 6).

(<http://www.who.int/emc/diseases/smallpox/Smallpoxeradication.html>)

{FernandezdeCorres1982} Fernández de Corres L, Garrastazu MT, Soloeta R, Escayol P. Nickel contact dermatitis in a blood bank. *Contact Dermatitis* 1982;8:32-37.

[Dermo-Jet]

{Fernandez-Vega1985} Fernandez-Vega M, Pey Illera C, Cornejo Sanz JJ, Bermudez Vergara P, Flandez Gonzalez B, Penin Gonzalez J, Penin Gonzalez A, Carretero Rodrigo N, Pascual Cuesta T. Higher level of seric insulin in post-prandium with hypodermic injection DG77, compared with the conventional needle syringe. XII Congress of the International Diabetes Federation, Madrid, 23-28 September 1985, *Diabetes Research and Clinical Practice* 1985;Suppl1:s163 (abstract no. 415).

{Field1985} Field LM. Madajet artifacts (correspondence). *Arch Dermatol* 1985;121(12):1483-1484.

[MadaJet]

{Figge1947a} Figge FHJ. Injections without needles. *American Practitioner (Am Pract & Digest. Treat.)* 1947;1:465

{Figge1947b} Figge FHJ, Scherer RP. Anatomical studies on jet penetration of human skin for subcutaneous medication without the use of needles [abstract]. *Anatomical Record* 1947;97:335.

{Figge1948} Figge FHJ, Barnett DJ. Anatomic evaluation of a jet injection instrument designed to minimize pain and inconvenience of parenteral therapy. *American Practitioner (Am Pract & Digest. Treat.)* 1948;3(4):197-206.

{Fillastre1970} Fillastre C, Conge G, Orssaud E. Utilization du Ped-O-Jet pour la vaccination par le BCG (Use of the Ped-O-Jet for vaccination with BCG). Geneva: World Health Organization, document WHO/TB/70.81, 1970.

***ID** {Fillastre1979} Fillastre C, Guerin N, Danusantoso H, Sardadi S. Étude comparative de deux vaccins BCG secs intradermiques. *Ann. Microbiol.* 1979;130 B(4):467-75.

{Fisch1996} Fisch A, Cadilhac P, Vidor E, Prazuck T, Dublanchet A, Lafaix C. Immunogenicity and safety of a new inactivated hepatitis A vaccine: a clinical trials with comparison of administration route. *Vaccine* 1996;14:1132-1136.

{Fjellner1983} Fjellner B, Herczka O, Wennersten G. Complications in the intralesional injection of triamcinolone acetonide by jet injector (Dermojet). *Acta Derm Venereol* 1983;63(5):456-7.

{Florentine1997} Florentine BD, Frankel K, Raza A, Cobb CJ, Greaves T, Carriere C, Martin S. Local anesthesia for fine-needle aspiration biopsy of palpable breast masses: the effectiveness of a jet injection system. *Diagnostic Cytopathology* 1997;17(6):472-476.

{Fournier1973} Fournier J. Les injecteurs sans aiguille et leur usage en médecine préventive. *Bull Soc Path Exp* 1973;66:332-339.

{Frymire1974} Frymire LJ, French TA. The Syrijet anesthetic gun for paracervical and uterosacral block. *Obstet Gynecol* Sep 1974;44(3):443-449.

~R {Furth1992} Furth PA, Shamay A, Wall RJ, Hennighausen L. Gene transfer into somatic tissues by jet injection. *Anal Biochem* 1992;205:365-368.
[Ped-O-Jet®]

{Furth1995a} Furth PA, Shamay A, Hennighausen L. Gene transfer in mammalian cells by jet injection. *Hybridoma* 1995;14:149-152.
[Ped-O-Jet, modified Dermo-jet]

{Furth1995b} Furth PA, Kerr D, Wall R. Gene transfer by jet injection into differentiated tissues of living animals and in organ culture. *Mol Biotechnol* 1995;4:121-127.
[Ped-O-Jet]

{Fynan1993} Fynan EF, Webster RG, Fuller DH, Haynes JR, Santoro JC, Robinson HL. DNA vaccines: protective immunizations by parenteral, mucosal and gene-gun inoculations. *Proc Natl Acad Sci USA* 1993;90:11478-82.
[Accell instrument, Agracetus]

{Galante1866} H. Galante et C^e. Notice sur quelques nouveaux instruments et appareils de chirurgie fabriqués par H. Galante. Paris, H. Galante et C^e, Fabricants d'instruments de chirurgie, 2, rue de l'École de Médecine, 2, Maison de gros: 28, Place Dauphine, 28. 1866, p. 43-44. Document accession no. «cote» 58935, La Bibliothèque Interuniversitaire de Médecine (BIUM), l'Université de Paris V - René Descartes.

SEE FIGURE AT RIGHT → [See Béclard/Galante1866]

{Galante1885} H. Galante & Fils. Catalogue Illustré des Instruments de Chirurgie. Paris, 2, rue de l'École-de-Médecine, 2. 1885. Document accession no. «cote» 21033, La Bibliothèque Interuniversitaire de Médecine (BIUM), l'Université de Paris V - René Descartes.

[Page 138 lists "Appareil aquapuncteur, de Dr. Sales-Girons, modèle Galante".

Dr. J. Sales-Girons was *médecin inspecteur* of the thermal springs Pierrefonds-les-Bains. He also developed aerosol devices for pulmonary inhalation

(http://www.epocnet.com/area_m/histepoc/figura27.html). See: Sales-Girons J. Traitement de la phthisie pulmonaire par l'inhalation pulvérisés et par les fumigations de goudron. Paris, F. Savy Librairie-Éditeur, 1859; p. 528, and 1860; and DuJardin-Beaumetz. Leçons de clinique thérapeutique. Octave Doin Ed. Paris, 1881.]

{Gallut1970} Gallut J, Lapeyssonie L. Vaccination anticholérique par la voie intradermique [Anticholera vaccination by intradermal route]. Les Comptes rendus de l'Académie Nationale de Médecine (Paris). Session of [Séance du] 3 November 1970;723-725.

{Gallut1971} Gallut J. La voie intradermique dans la vaccination anticholérique [Intradermal inoculation in anti-cholera vaccination].

APPAREIL POUR L'AQUA-PUNCTURE
(de M. le docteur Sales-Girons)

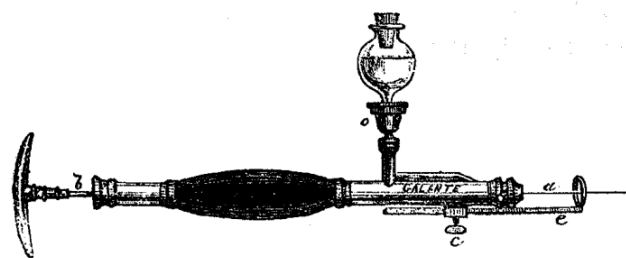


Figure 33.

Cet appareil se compose : 1° d'un corps de pompe dont le diamètre intérieur n'exécède pas 0^m 003, ce qui permet à l'opérateur de produire sur le liquide, à l'aide du piston, une pression considérable, relativement à la force qu'il emploie; 2° d'un récipient en verre ayant à peu près la forme d'un entonnoir, maintenu sur le corps de l'appareil au moyen d'une pièce métallique *a*, percée d'outre en outre, et par laquelle il communique avec ce dernier.

L'une des extrémités de l'instrument se trouve terminée par une petite plaque en platine, percée au milieu d'un trou capillaire, la même extrémité supporte également une tige *e* surmontée d'un anneau, laquelle sert de point d'appui et de guide à l'appareil lorsqu'il fonctionne.

Pour cela faire, après avoir placé le liquide, qui doit servir à l'opération, dans l'entonnoir en verre, on aspire ledit liquide en attirant à soi le piston, de manière à ce que le corps de pompe en soit rempli; on applique ensuite le guide *e* sur la partie destinée à être injectée; il suffit alors de pousser en avant la tige *b*, tout en maintenant, de

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la main gauche, le corps de l'appareil, pour obtenir un jet filiforme d'une telle force qu'il pénètre facilement dans les tissus.

De tous les appareils connus pour ce genre d'opérations, celui-ci, que nous avons construit d'après l'idée de M. le docteur Sales-Girons, est le seul aussi peu volumineux et aussi portatif.

Médecine Tropicale (Marseilles) Jan-Feb 1971;31(1):124-126.

{Galy1992} Galy M, Genet A, Saliou P. Un progrès dans le domaine de l'injection sans aiguille: le système Imule®. S.T.P. Pharma Pratiques (France) 1992;4:261-266.

~R 2002Sep04{Gapochko1981} Gapochko KG, Gamleshko KhP, Gerasiuk LG, Emel'ianova OV, Litvinova AP. {Russian title pending} [Experimental basis for associated subcutaneous jet injection immunization against plague and smallpox] Zh Mikrobiol Epidemiol Immunobiol. 1981 Jan;(1):65-69. Russian. (PMID: 7234244)

{Gapochko1992} Gapochko KG, Vasilenko AZh, Misnikov OP, Savel'ev AP, Stepanov AV, Titova TS. Kliniko-immunologicheskoe obosnovanie assotsiirovannoi immunizatsii [The clinico-immunological validation of associated immunization]. Voenno-meditsinskii Zhurnal [Military Medical Journal] (Russia) Mar 1992;(3):35-38 (UI: 93070014, PMID: 1441243).
[Clinical studies of 8 commercial national vaccines (typhoid, plague, typhus, smallpox, tick-borne encephalitis, yellow-fever, cholera and sextaanatoxine)]

{Garbsch1966} Garbsch H, Pietschmann H. Rontgenologische Darstellung der Gelenks- und Weichteilinfiltration mit dem "Hypospray Jet Injector" [Radiological demonstration of joint and soft tissue infiltration with the "Hypospray jet injector"]. Z Rheumaforsch Aug 1966;25(7):237-242.

[radiographs]

{Gardner1997} Gardner MA, Stout R, Segarra V, Redmond M, Milne L. North Carolina clinical survey: Implementation of the Bioject needle-free injection management system™ into North Carolina's state public health system. Portland, Oregon: Bioject, Inc., 5 March 1997.

{Gateff1968} Gateff C. La vaccination directe B.C.G. par injecteur sous pression sans aiguille: Premières évaluations au Gabon en campagne de masse [Direct B.C.G. vaccination by pressure injector without needle: Initial evaluation in mass campaign in Gabon]. Médecine Tropicale (Marseilles) Nov-Dec 1968;28(6):746-759.

~R {Gateff1969} Gateff C. Vaccination BCG par injecteur sous pression sans aiguille. Premières évaluations d'un essai contrôlé [BCG vaccination by needle-free pressure injector. First evaluations of a controlled trial]. Memoire, École Nationale de Santé Publique, Rennes, France, édit., 1969:1-70.

{Gateff1970} Gateff C, Labusquière R, Boisson P. Étude de l'influence de la cadence de travail dans la vaccination B.C.G. par injecteur sous pression sans aiguille [Study of the influence of the rate of work on BCG vaccination with needle-free pressure injector].. Médecine Tropicale (Marseilles) 1970;30(5):654-662.

{Gateff1971a} Gateff C. Vaccination BCG par injection sous pression sans aiguille, interaction de la concentration du vaccin et de la dose vaccinale. Médecine Tropicale July-August 1971;31(4):411-416.

{Gateff1971b} Gateff C, Dewitt WE, Lemarinier G, Bradley M, Labusquière R. Les anticorps vibriocides après vaccination anticholérique par injecteur sous pression sans aiguille [Vibriocidal antibodies after anti-cholera vaccination with a jet injector without a needle]. *Médecine Tropicale (Marseille)* Nov-Dec 1971;31(6):723-730.

{Gateff1972a} Gateff C, Robin Y, Labusquière R, Le Gonidec G, Lemarinier G, Bradley M. Comparaison de deux vaccins anti-mariques administrés par injecteur sous pression sans aiguille [Comparison of two yellow fever vaccines administered by pressure injector without needle]. *Médecine Tropicale (Marseille)* Mar-Apr 1972;32(2):193-197.
[SC compared to ID; latter did poorly]

{Gateff1972b} Gateff C. Vaccination BCG par injecteur sous pression sans aiguille. Interaction du manipulateur et de l'injecteur [BCG vaccination by jet injection without needle. Interaction of the manipulator and injector]. *Médecine Tropicale (Marseille)* Sep-Oct 1972;32(5):601-606.

{Gateff1973a} Gateff C. BCG vaccination by Ped-O-Jet pressure injector: an out-of-date method. *Bull Int Union Tuberc* Dec 1973;48(Suppl):16-28.

{Gateff1974} Gateff C, Ravisse P, Monchicourt D, McBean M, Labusquière R. Étude de la pénétration d'un vaccin BCG inoculé par injecteur sous pression muni de bague de recul [The penetration of BCG vaccine inoculated by an injector under pressure provided with a recoil ring]. *Bull Soc Pathol Exot Filiales* Mar-Apr 1974;67(2):140-145.

{Gerbert1996} Gerbert J, Burns S, Liedtke LL. Anesthesia blocks of the lower extremity - comparing the Biojector® with needle and syringe. *J Am Podiatric Med Assoc* 1996;86(5):195-204.

{Gibbs} Gibbs SEJ, Johnson C, Littell R, Gibbs EPJ. Tissue damage associated with jet injection vaccination of Holstein calves. Unpublished manuscript, Univ. of Florida.

{Gibson1986} Gibson JR, Harvey SG, Kemmett D, Salisbury J, Marks P. Treatment of common and plantar viral warts with human lymphoblastoid interferon-alpha-pilot studies with intralesional, intramuscular and Dermo Jet injections. *Br J Dermatol* Aug 1986;115 Suppl:76-9.

{Gigauri1972} Gigauri VS, Popova EB. Osobennosti bezygol'nykh in"ektsii i perspektivy primeneniia in"ektorov [Characteristics of needleless injections and the prospects for using injectors]. *Khirurgiia (Moscow Russia)* Dec 1972;48(12):22-26.

{Gigauri1973a} Gigauri VS; Matveev VA; Popova EB; Rogachev VT; Smoliarov BV. Bezygol'nye in'ektorov otechestvennogo proizvodstva [Soviet-manufacture jet injectors]. *Voenno-meditsinskii Zhurnal [Military Medical Journal] (Russia)* Jan 1973;1:57-59.

{Gigauri1973b} Gigauri VS, Vinnitskii LI, Popova EB. Skorost' rassasyvaniia veshchestva v tkaniakh pri bezygol'nykh in"ektsiakh [Resorption rate in the tissues in needle-less injections].

Zh Mikrobiol Epidemiol Immunobiol (Russia) 1973 Mar;50(3):93-95.

{Gigauri1973c} Gigauri VS; Nikiforov VN; Popova EB; Koroteev AV. Primenenie bezygol'nykh in'ektorov v usloviakh statsionara [Use of jet injectors in hospital conditions]. Sov Med Oct 1973;36(10):145-146.

{Gigauri1973d} Gigauri VS, Popova EB, Smoliarov BV, Rogachev VT. Vozmozhnosti bezygol'nogo vvedeniia razlichnykh veshchestv zhiivotnym [Possibilities of needleless administration of various substances to animals]. Veterinariia (Russia) 1973 Dec;12:93-95.

{Gigauri1974} Gigauri VS, Koroteev AV. Napravleniia reguliatsiia rasprostraneniia veshchestva v tkaniakh pri bezigol'nykh in'ektsiiakh [Controlled regulation of drug distribution in the tissues in jet injections]. Eksp Khir Anesteziol (Russia) May-Jun 1974 ;(3):47-50.

{Gigauri1975a} Gigauri VS, Uskova TA, Vazhigina MA, Mukhitdinov ShM. Opyt primeneniia struinogo bezygol'nogo vvedeniia anestezirovuiushchikh veshchestv pri tonzillektomii u detei [Experience with using the needleless jet administration of anesthetizing substances in tonsillectomy in children]. Vestn Otorinolaringol Jan-Feb 1975;(1):65-68.

{Gigauri1975b} Gigauri VS; Konstantinova NP; Vinnitskii LI; Kinduris VIu; Zhidkov IL. Skorost' vyvedeniia iz paratonzilliarnoi kletchatki veshchestv, vvodennykh bezygol'nym in'ektorom v eksperimente [Rate of elimination from the paratonsillar tissue of substances administered by means of jet injection in experiments]. Vestn Otorinolaringol (Russia) Nov-Dec 1975;(6):26-29.

{Gigauri1976a} Gigauri VS, Konstantinova NP, Kinduris VIu. Osobennosti vnedreniia i rasprostraneniia veshchestva v tkaniakh glotki pri bez'igol'nykh in'ektsiiakh v eksperimente [Characteristics of infiltration and distribution of a substance in the pharyngeal tissues during experimental jet injections]. Vestn Otorinolaringol Jan-Feb 1976;(1):52-56.

{Gigauri1976b} Gigauri VS; Milonov OB; Got'e SV. Bezygol'nyi in'ektor dlia vmeshatel'stv na pecheni [Jet injector for operations on the liver]. Khirurgiia (Mosk) May 1976;(5):151-153.

{Gigauri1976c} Gigauri VS, Krotov AI, Melemuka IV, Rusak LV, Sukhomlina RA. Vozmozhnost' ispol'zovaniia bez'igol'nogo in'ektora v tseliakh eksperimental'nogo izucheniia mestnoi terapii al'veokokkoza [Possibility of use of a jet injector for experimental study of local therapy of alveococcosis]. Med Parazitol (Mosk) 1976 Sep-Oct;45(5):607-609.

{Gigauri1977a} Gigauri VS, Zakharov BG, Galkina TV, Dul'tsev IuV. Osobennosti mestnoi anestezii, provodimoi bezugol'nymi in'ektorami [Special features of local anesthesia with needleless injectors]. Anesteziol Reanimatol Jan-Feb 1977;(1):67-71.

{Gigauri1977b} Gigauri VS; Koroteev AV; Marchuk LM. Analiz raboty prizhimnykh ploshchadok bezygol'nykh in'ektorov [Analysis of the performance of the clamping pads of jet injectors]. Med Tekh Jan-Feb 1977;(1):23-27.

{Gigauri1977c} Gigauri VS; Zakharov BG. Primenenie bezygol'nogo in'ektora BI-3 dlia provedeniia anestezii pri povrezhdeniiakh kisti [Use of the BI-3 jet injector for anesthesia in hand injuries]. Khirurgiia (Mosk) 1977 Jun;(6):120-121.

{Gigauri1978a} Gigauri VS; Nikonov VA; Zahkarov BG; Smoliarov BV. Primenenie modifitsirovannogo in'ektora BI-3 v travmatologicheskoi praktike [Use of a modified BI-3 injection in traumatological practice]. Voenno-meditsinskii Zhurnal [Military Medical Journal] (Russia) Jan 1978;(1):62.

{Gigauri1978b} Gigauri VS, Nikonov VA, Koroteev AV. Prichiny vozmozhnykh oslozhnenii pri bezygol'nykh in'ektsiiakh i ikh profilaktika [Causes of possible complications with jet injections and their prevention]. Voenno-meditsinskii Zhurnal [Military Medical Journal] (Russia) Mar 1978;(3):40-42.

{Gigauri1978c} Gigauri VS, Koroteev AV, Vinogradova LN, Bogomolova NS, Kachko FV. Kontsentratsiia amptisillina v krovi pri bezygol'nom struinom i igol'no-shpritsevom sposobakh vvedeniia [Ampicillin concentration in the blood when administered by jet injection and needle-syringe methods]. Antibiotiki (Russia?) 1978 Apr;23(4):341-345.

~R {Gigauri1980} Gigauri, V. S. (Vladimir Spiridonovich). Bezygol'nye in'ektsii. [GET ENGLISH TRANSLATION OF TITLE] Publisher: Moskva: Meditsina, 1980. Description: 269 p.: ill. UI: 8111095, Language: Russian

{Girier1966} Girier L, Berthelot P, Phelippon M. Vaccinations collectives par appareil automatique à injection par jet transcutané [Group vaccinations by an automatic apparatus for injection by transcutaneous jet]. Rev Corps Santé Armées Terre Mer Air (France) Feb 1966;7(1):147-156.

{Glosemeyer1979} Glosemeyer H, Mendling W, Stockhausen H. Die transvaginale Pudendus-Anaesthesie mit dem Jet-Injektor [Transvaginal pudental anesthesia with a jet injector]. Geb. Frauenheilk. 1979;39:954-956.
[Med-E-Jet]

{Gonzalez1997} Gonzalez JL, Verrips GH, Fekkes M, Hirasing RA, Groth M. Psychological responses to the injection of insulin with the disposable front-end Medi-Jector[®] (MJ-6). Today's Therapeutic Trends - The Journal of New Developments in Clinical Medicine 1997;15:53-71.
[See also: Leiden: TNO, TNO-report 97.045, pp. 53-71: UI: 100888888, Control Number: 888888 (<http://www.tno.nl/homepage.html>)]

{Gorbatov1989} Gorbatov AV, AU - Gorbatova LN. Primenenie bezygol'nogo in'ektora (BI-8) v usloviikh stomatologicheskogo kabineta raionnoi bol'nitsy [The use of a jet injector (the BI-8) at the oral medicine office of a district hospital]. Stomatologiia (Mosk) Nov-Dec 1989;68(6):70-71 (UI: 90162731, PMID: 2533752).

{Gotschlich1972a} Gotschlich EC, Rey M, Triau R, Sparks KJ. Quantitative determination of the human immune response to immunization with meningococcal vaccines. J Clin Investigation

1972;51:89-96.

[Ped-O-Jet®, meningococcus A vaccine, subcutaneous & intradermal]

{Gotschlich1972b} Gotschlich EC, Rey M, Etienne J, Sanborn WR, Triau R, Cvjetanovic B. The immunological responses observed in field studies in Africa with group A meningococcal vaccines. *Prog Immunobiol Stand* 1972;5:485-491.

[Ped-O-Jet, Senegal, Nigeria]

{Grabowsky1992} Grabowsky M, Hadler S. Safety of jet injectors. Unpublished handouts used for presentation to the CDC Advisory Committee on Immunization Practices, Atlanta, GA, 9-10 June 1992, pp. 1-18.

{Grabowsky1994} Grabowsky M, Hadler SC, Chen RT, Bond WW, de Souza Brito G. Risk of transmission of hepatitis B virus or human immunodeficiency virus from jet injectors and from needles and syringes. Unpublished manuscript draft, dated January 3, 1994 (20 pages of text, 5 pages of tables, 4 pages of references, 2 pages of figures).

{Grau1997} Grau T, Ernst CP, Willershausen B. Eine nadellose, intraorale Injektionstechnik. Klinische Studie zur Patientenakzeptanz des nadellosen Injektionsgerätes Syrijet Mark II. (Mizzy, Inc., N.J., U.S.A.) [A needle-free intraoral injection technic. Clinical study of patient acceptance of the Syrijet Mark II Needleless Injector (Mizzi, Inc., N.J., U.S.A.)]. *Schweiz Monatsschr Zahnmed (Switzerland)* 1997;107(11):993-1002.

E

{Greenberg1994} Greenberg RS, Maxwell LG, Zahruak, M, Yaster, M. Preinduction of anesthesia in children with midazolam using the Bioject Jet Injector. Poster presentation at the annual meeting of the American Society of Anesthesiologists, October 18, 1994.

{Greenberg1995} Greenberg RS, Maxwell LG, Zahurak MS, Yaster M. Preanesthetic medication of children with midazolam using the Biojector jet injector. *Anesthesiology* 1995;83:264-269.

{Greenfield1972} Greenfield W, Karpinski JF. Needleless jet injection in comprehensive pain control and applications to oral surgery. *Anesth Prog.* Jul-Aug 1972;19(4):94-97.

{Greenfield1973} Greenfield W, Karpinski JF. Clinical application of jet injection to comprehensive pain control. *Anesth Prog.* 1973;20(4):110-112.

{Greenwood1980} Greenwood BM, Wali SS. Control of meningococcal infection in the African meningitis belt by selective vaccination. *Lancet* 1980-;1:729-732.

[Imo-Jet]

{Griffiths1965} Griffiths MI, Davitt MC, Brindle TW, Holme T. Intradermal BCG vaccination by jet injection. *British Medical Journal* 1965;2:399-401.

{Griffiths1971} see: British Thoracic and Tuberculosis Association 1971.

{Gross1970} Gross PA, Grigsby SF, Kogan BA, Heidbreder GA. Jet injector: appraisal of its use in a local setting. *Am J Public Health Nations Health*. Sep 1970;60(9):1839-1844.

[Hypospray[®], measles vaccine, comparison with needle-syringes of time needed for physician and nurse to administer mass vaccinations]

{Guérard/Mathieu1865} Guérard, Alph. Présentation, au nom de M. Mathieu, d'un appareil dit à *douches filiformes*, Séance du 2 mai 1865, Présidence de M. Bouchardat, Vice-Président [Presentation in the name of M. Mathieu, of an apparatus for threadlike sprays, meeting of 2 May 1865, Monsieur Bouchardat, vice-president, presiding]. *Bulletin de l'Académie Impériale de Médecine (France)*, 1865;30:676-677 [Document accession no. «cote» 90164, La Bibliothèque Interuniversitaire de Médecine (BIUM), l'Université de Paris V - René Descartes]

{Guha1982} Guha SN, Dutta M. Immunization with jet injectors: an experience of 5 years. *J Commun Dis (India)* 1982;14(2): 154-156.

{Haensler1999} JeanHaensler, Cécile Verdelet, Violette Sanchez, Yves Girerd-Chambaz, Annabelle Bonnin, Emanuelle Trannoy, Shiv Krishnan, Pierre Meulien, Intradermal DNA immunization by using jet-injectors in mice and monkeys, *Vaccine* 1999;17:628-638.

[Isajet[™]]

{Hahn1968} Hahn W. Zur Verwendung von Dermo-Jet in der Mundhöhle [Oral uses of Dermo-Jet]. *Quintessenz* 1968 Mar;19(3):21-22.

{Hallé1986} Hallé J-P, Lambert J, Lindmayer I, Menassa K, Coutu F, Moghrabi A, Legendre L, Legault C, Lalumière G. Twice daily mixed regular and NPH insulin injections with new jet injector versus conventional syringes: pharmacokinetics of insulin absorption. *Diabetes Care* 1986;9:279-282.

~R 2002Aug6 {Hanson1979} Hanson, Stefan (EPI short term consultant). Report on Jet Injector Study [to WHO/EPI], Ghana, November 1978-May 1979. [cited in WHO1980]

{Hardison1977} Hardison CD. Application of a versatile instrument for production of cutaneous anesthesia without needle penetration of the skin. *J ACEP* 1977;6(6):266-8..

{Harenberg1982} Harenberg J, Arleth D, Köppern K, Matthes K, Zimmermann R. Subkutane Applikation von Heparin mit einem Injektor [Subcutaneous application of heparin with a jet injector (author's transl)]. *Deutsche Medizinische Wochenschrift* 2 Apr 1982;107(13):497-500.

[Med-E-Jet]

{Hartikka2001} Hartikka J, Bozoukova V, Ferrari M, Sukhu L, Enas J, Sawdey M, Wloch MK, Tonsky K, Norman J, Manthorpe M, Wheeler CJ. Vaxfectin enhances the humoral immune response to plasmid DNA-encoded antigens. *Vaccine*, 2001;19(15-16):1911-1923.

[Biojector[®]2000, Medi-Jector Choice[™], and Activa AdvantaJet[™] increase antibody response of new Vaxfectin[™] adjuvant used with DNA vaccine in mice, compared to needle and syringe.]

~R 2004Jan14 {Haupt2003} Haupt G, Haupt A, Richter KD, Senge T. New way to deliver fluids: endoscopic jet injection into the beagle prostate. *Journal of Urology* 2003;170(5):2097-2100.

~R 2002 Hanson, Stefan (EPI short term consultant). Report on Jet Injector Study [to WHO/EPI], Ghana, November 1978-May 1979.
[cited in WHO1980]

{Haynes1996} Haynes JR, McCabe DE, Swain WF, Widera G, Fuller JT. Particle mediated nucleic acid immunization. *J Biotech* 1996;44:37-42.
[Accell®]

{Hawkins2002} Hawkins JM, Moore PA. Local anesthesia: advances in agents and techniques. *Dent Clin North Am* 2002 Oct;46(4):719-32, ix.

{Helm1969} Helm F, Berger JE, McEvoy BF, Klein E. Studies with the Hypospray. Observations on penetration and distribution of India ink in skin and tumors. *N Y State J Med* 15 Feb 1969;69(4):561-563.

R-2003Jan3 {Henderson1972} Henderson A. Vaccination antivariolique . In: Séminaire sue les vaccinations en Afrique. Publication of Centre International de l'Enfance, Paris, 1972.
[cited in Fournier1973]

{Hendrickse1965} Hendrickse RG, Montefiore D, Sherman PM, Sofoluwe GO. A further study on measles vaccination in Nigerian children. *Bull WHO* 1965;32:803-808.
[ARTICLE NOT YET CONFIRMED AS "NEEDLE-FREE"]

{Hendrickse1966a} Hendrickse RG, Montefiore D, Peradze T, Sherman P, Powell M. Measles vaccination. Report of large scale trial of further attenuated measles vaccine in Nigeria. *J Trop Med Hyg* 1966;69:112-116.
[Ped-O-Jet]

~R {Hendrickse1966b} Hendrickse RG, Montefiore D, Sherman P, Peradze T. Comparative trial of further attenuated measles vaccines. *Brit Med J* 26 Mar 1966;5490:779-781.
[ARTICLE NOT YET CONFIRMED AS "NEEDLE-FREE"]

{Hendrickse1968} Hendrickse RG, Montefiore D. Measles vaccination with reduced dosage. *Brit. Med. J* 1968 Oct 5;3(622):28-30.
[Ped-O-Jet®]

{Hendrix1966} Hendrix C, Nichols C, Hirsh L. A new method of administering the tuberculin skin test. *Am J Public Health* 1966 May;56(5):818-20.

{Herbst} Herbst J. Clinical evaluation of a needle free injection device for military applications. Unpublished, undated document (8 pages) distributed by Biojector, Inc., Portland, Oregon, USA.

{Heyworth1970} Heyworth B. Combined BCG and smallpox vaccination (a field trial in Rwanda). Journal of Tropical Pediatrics. 1970 March;16(1):17-19.
[Dermojet, intradermal]

{Hingson1947} Hingson RA, Hughes JG. Clinical studies with jet injection. A new method of drug administration. Current Researches in Anesthesia and Analgesia 1947;26(6):221-230.

{Hingson1948a} Hingson RA, Johansen FA, Erickson PT, et al. Preliminary study of the Hypospray for parenteral therapy in its relation to the management of leprosy. Int J Leprosy April-June 1948:173-180.

{Hingson1948b} Hingson RA, Easley EJ, Gray AL, Tucher C, Kiesselback MR, Parkhurst G, Usher G, Davidson H. Hypospray administration of penicillin in the treatment of gonorrhea. J Ven Dis Inform 1948;29:61-63.

{Hingson1949} Hingson RA. The development of the Hypospray for parenteral therapy by jet injection. Anaesthesiology 1949;10:66-75.

{Hingson1952} Hingson AA, Figge FHJ. A survey of the development of jet injection in parenteral therapy. Current Researches in Anesthesia and Analgesia. Nov.-Dec. 1952;31:361-366.

{Hingson1957} Hingson RA, Davis HS, Bloomfield RA, Brailey RF. Mass inoculation of the Salk polio vaccine with the multiple dose jet injector. GP [General Practitioner] 1957;16:94-96.
[Press-O-Jet]

{Hingson1963a} Hingson RA, Davis HS, Rosen M. The historical development of jet injection and envisioned uses in mass immunization and mass therapy based upon two decades' experience. Military Medicine 1963;128:516-524.

{Hingson1963b} Hingson RA, Davis HS, Rosen M. Clinical experience with one and a half million jet injections in parenteral therapy and in preventive medicine. Military Medicine 1963;128:525-528.

{Hingson1967} Hingson RA, Krantz A. Origen y perfeccionamiento del inyector a presion de uso manul para programas de inmuizacion en gran escala. Boletín de la Oficina Sanitaria Panamericana Dec 1967;63(6):467-78.

[Does English version of above exist?]

{Hingson1989} Hingson, Ralph. Robert Hingson interviewed by Ralph Hingson (1989-March-31). (videotape, VHS, NTSC format, <http://www.asahq.org/wlm/JWP.html>). From the The John

W. Pender Collection of the Living History of Anesthesiology, [The Wood Library – Museum of Anesthesiology \(http://www.asahq.org\)](http://www.asahq.org), Park Ridge, Illinois, USA.

{Hirsh1948} Hirsh HL, Welch H, Milloff B, and Katz S. Administration of penicillin and streptomycin by means of the Hypospray apparatus (jet injection); absorption, toxicity, and stability. *J Lab Clin Med* 1948;33:805-810.

{Hoffman2001} Hoffman PN, Abuknesha RA, Andrews NJ, Samuel D, Lloyd JS. A model to assess the infection potential of jet injectors used in mass immunisation. *Vaccine*. 16 July 2001;19(28-29):4020-4027.

[A = Ped-O-Jet® ?, B = MEDiVAX™ multi-use-nozzle prototype ?, C = SICIM prototype ?, D = Med-E-Jet® ?]

{Hoke1992} Hoke, C.H., Binn, L.N., Egan, J.E., DeFraités, R.F., MacArthy, P.O., Innis, B.L., Eckels, K.H., Dubois, D., D'Hondt, E., Sjogren, M.H., Rice, R., Sadoff, J.C., and Bancroft, W.H. Hepatitis A in the US Army: Epidemiology and Vaccine Development. *Vaccine* 1992, 10 (Supplement 1), S75-79.

{Hoke1995} Hoke CH Jr, Egan JE, Sjogren MH, Sanchez J, DeFraités RF, MacArthy PO, Binn LN, Rice R, Burke A, Hill J, et al. Administration of hepatitis A vaccine to a military population by needle and jet injector and with hepatitis B vaccine. *J Infect Dis* March 1995;171(Suppl 1):s53-s60.

{Hollingsworth2000} Hollingsworth SJ, Hoque K, Linnard D, Corry DG, Barker SGE. Delivery of low molecular weight heparin for prophylaxis against deep vein thrombosis using a novel, needle-less injection device (J-Tip®). *Ann R Coll Surg Engl* 2000;82:428-431.

***ID** {HongKongMeaslesVaccineCommittee1967} Hong Kong Measles Vaccine Committee. Comparative trial of live attenuated measles vaccine in Hong Kong by intramuscular and intradermal injection. *Bull World Health Organ* 1967;36:375-384.

~R {Horn1975} Horn H, Opitz B, Schau G. Investigation into the risk of injection by the use of jet injectors. *Health Soc. Serv. Journal* [English translation of German journal??] 1975;85:602-603.
[??? Is the journal actually *Z Gesamte Hyg* or *Dtsch Gesundheitsw* ???]

{Houdijk1997} Houdijk ECAM, Herdes E, and Delemarre-Van de Waal HA. Pharmacokinetics and pharmacodynamics of recombinant human growth hormone by subcutaneous jet-or needle-injection in patients with growth hormone deficiency. *Acta Paediatr* December 1997;86(12):1301-1307.

{Houtzagers1988a} Houtzagers CMGJ, Berntzen PA, van der Stap H, Heine RJ, van der Veen EA. Absorption kinetics of short- and intermediate-acting insulins after jet injection with Medi-Jector II. *Diabetes Care* October 1988;11(9):739-742.

{Houtzagers1988b} Houtzagers CMGJ, Visser AP, Berntzen PA, Heine RJ, van der Veen EA.

The Medi-Jector II: efficacy and acceptability in insulin-dependent diabetic patients with and without needle phobia. *Diabet Med* Mar 1988;5(2):135-138.

{Hu1991} Hu DJ, Kane MA, Heymann DL. Transmission of HIV, hepatitis B virus, and other bloodborne pathogens in health care settings: a review of risk factors and guidelines for prevention. *Bull World Health Organ* 1991;69(5):623-630.

{Hughes1948} Hughes JF, Jordan RG, Hill FS. Jet injection in pediatric practice. *Memphis Medical Journal* 1948;23:116-120.

~R {Hughes1949a} Hughes JG, Jordan RG, Hill FS. Current status of jet injection. *Southern Medical Journal* 1949;42:296-302 (303??).

{Hughes1949b} Hughes JG, Jordan RG, Hill FS. Jet injection in pediatric practice. *Pediatrics* 1949;3:801-812.

{Hughes1969a} Hughes GRV, Currey HL. Hypospray treatment of tennis elbow. *Ann Rheum Dis* Jan 1969;28(1):58-62.

{Hughes1969b} Hughes GRV. The use of the Hypospray in the treatment of minor orthopaedic conditions. *Proc R Soc Med* Jun 1969;62(6):577.

{Hurwitz1964} Hurwitz LH. The Dermo-jet painless injection without a needle. *J Am Podiatric Association*. 1964;54:639.

{Ikehara1972} Ikehara NK, McKibben DH, Pechersky JL, Rapp R. Comparison of jet injection and needle-syringe injection techniques in production of edema. *J Dent Res* Mar-Apr 1972;51(2):573-576.

{IndustrialPharmacistsGroup1998} Industrial Pharmacists Group. Coming soon . . . "near-to-market" novel drug delivery systems. *The Pharmaceutical Journal (Royal Pharmaceutical Society of Great Britain)* 26 September 1998;261:509.

{Inoue1996} Inoue N, Kobayashi D, Kimura M, Toyama M, Sugawara I, Itoyama S, Ogihara M, Sugibayashi K, Morimoto Y. Fundamental investigation of a novel drug delivery system, a transdermal delivery system with jet injection. *Int J Pharmaceutics* 1996;137:75-84.

Hughes JG, Jordan RG, Hill FS. Current status of jet injection. *Southern Medical Journal* 1949;42:296-302 (303??).

*ID {Irvine1964} Irvine KN, BarR A. Conversion after freeze-dried BCG. *British Medical Journal* 1964;1:1424-1425.
[intradermal BCG]

{Ivannikov1980} Ivannikov IuG, Efimenko IB, Marinich IG, Luk'ianov IuV, Naikhin AN. Otsenka effektivnosti massovoi profilaktiki grippa s ispol'zovaniem inaktivirovannoi

khromatograficheskoi vaksiny v Leningrade [Evaluation of mass influenza prevention effectiveness using an inactivated chromatographic vaccine in Leningrad]. Zh Mikrobiol Epidemiol Immunobiol Nov 1980;(11):18-27 (UI: 81081779, PMID: 6449811).

[Influenza vaccine during the influenza A (H3N2) epidemic of 1979-1980]

{Jackson1993} Jackson J, Dworkin R, Tsai T, McMullen R, Kuchmak N. Comparison of antibody response and patient tolerance of yellow fever vaccine administered by the Biojector® needle-free injection system versus conventional needle/syringe injection. International Society of Travel Medicine Conference, Paris, 1993.

{Jackson2001} Jackson LA, Austin G, Chen RT, Stout R, DeStefano F, Gorse GJ, Newman FK, Yu O, Weniger BG. Vaccine Safety Datalink Study Group. Safety and immunogenicity of varying doses of trivalent inactivated influenza vaccine administered by needle-free jet injectors. Vaccine 2001;19:4703-4709.

{Jeanneret1967} Jeanneret M. Anesthésie de surface par le «Dermo-Jet » [Surface anesthesia with the "Dermo-jet"]. SSO Schweizerische Monatsschrift für Zahnheilkunde (Switzerland) Dec 1967;77(12):1155-1157.

{Jenkins1995} Jenkins M, Kerr D, Fayer R, Wall R. Serum and colostrum antibody responses induced by jet-injection of sheep with DNA encoding a Cryptosporidium parvum antigen. Vaccine 1995 13(17):1658-64.

{Johnson2000} Johnson JO, Kern SE, White JL. Local anesthesia for venous and arterial access: comparison of jet injection with needle infiltration. International Anesthesia Research Society (IARS) 74th Clinical and Scientific Congress, [?location, day-month?] 2000. [abstract S-9] <http://iars.com/abstracts/abstracts/S1/S9.htm>

{Jopling1966} Jopling WH. The use of a Dermojet injector for skin biopsies. Lepr Rev Oct 1966;37(4):219-220.

{Jovanovic-Peterson1993} Jovanovic-Peterson L, Sparks S, Palmer JP, Peterson CM. Jet-injected insulin is associated with decreased antibody production and postprandial glucose variability when compared with needle-injected insulin in gestational diabetic women. Diabetes Care 1993;16(11):1479-1484.

{Juel-Jensen1965} Juel-Jensen BE, MacCallum FO. Herpes simplex lesions of face treated with idoxuridine applied by spray gun: results of a double-blind controlled trial. British Medical Journal 1965;1:901-903.

~R {Kalabus1966} Kalabus F, Sansarricq H, Lambin P, Proulx J, Hilleman MR. Standardisation du vaccine vivant combiné contre la rougeole et la variole et son application dans une campagne de masse en Haute-Volta [Standardization of combined live vaccine against measles and smallpox and their use in a mass campaign in Upper Volta]. Rapport Final, XIII^e Conférence Ministérielle de l'OCCGE [Organisation de Coopération et de Coordination pour la Lutte Contre

les Grandes Endémies], 2-8 November 1966, Abidjan.

{Kellum1987} Kellum RE. Intralesional injection of sodium stibogluconate by dermal pressure-jet instrument [letter] *J Am Acad Dermatology* October 1987;17(4):694.

{Kemezys1997} Kemežys R, Lašiene D, Lašas L. Naujo augimo hormono transjেকcijos klinikinis ivertinimas [Clinical evaluation of a needle-free device for subcutaneous administration of growth hormone.] *Medicina (Kaunas)* 1997;33(2):46-48 (ISSN: 1010-660X, Kaunas Medical University, Vilnius, Lithuania).
[Medi-Jector®]

{Kerum1987} Kerum G, Profozic V, Granic M, Skrabalo Z. Blood glucose and free insulin levels after the administration of insulin by conventional syringe or jet injector in insulin treated type 2 diabetics. *Horm Metab Res.* September 1987;19:422-425.

{Keshtgar1999a} Keshtgar MRS, Barker SGE, Ell PJ. Needle-free vehicle for administration of radionuclide for sentinel-node biopsy. *Lancet* 24 April 1999;353:1410-1411.
[J-Tip®]

{Keshtgar1999b} Keshtgar MRS, KocjanG. A novel, pain-free approach to fine needle aspiration cytology. *Acta Cytologica* 1999;43(4):700 (abstract C020, 26th European Congress of Cytology).
[J-Tip® anesthesia]

{Keshtgar1999c} Keshtgar MRS, Waddington WA, Lakhani SR, Ell PJ. The Sentinel Node in Surgical Oncology. New York: Springer-Verlag, 1999, pp.187-189 of 193. ISBN 3-540-65176-4.

{Khitrov1993} Khitrov NA, Sil'vestrov VP. O lechenii deformiruiushchego osteoartroza igol'no-struinyami intra- i periartikuliarnymi in"ektsiiami lekarstvennykh sredstv [The treatment of osteoarthritis deformans by needle-jet intra- and periarticular drug injections] *Ter Arkh* 1993;65(8):62-65 (UI: 94024681, PMID: 8211806).

{Khitrov1994} Khitrov NA, Sil'vestrov VP. Klinicheskaia effektivnost' intra- i periartikuliarnogo vvedeniia lekarstvennykh preparatov igol'no-struinyam in"ektorom ISI-1 dlia lecheniia revmatoidnogo artrita [The clinical efficacy of the intra- and periarticular administration of drugs with the ISI-1 jet-needle injector for treating rheumatoid arthritis]. *Ter Arkh* 1994;66(8):67-70 (UI: 95076439, PMID: 7985161).

{Kindt1971} Kindt H. Erfahrungen einer amerikanischen Gesundheitsbehörde mit Impfpistolen bei Massenimpfungen von Schulkindern [Experience in the American public health service with a vaccination gun for mass immunization of schoolchildren]. *Arbeitsmed, Sozialmed, Arbeitshyg.* 1971;6:216.

{King1998} King S, Bareille P, Stanhope R. re: Growth hormone treatment without a needle [letter]. *J pediatr Endocrinol Metab* 1998;11(1):87.

- {King2002} King T. A review of needlefree injection technologies. World Pharma Web, (Pharma Ventures, Ltd.), article 4. 2002;:1-5 (URL: <http://www.worldpharmaweb.com/ddcr/article4.pdf>).
- {Kirschenheuter1965} Kirschenheuter F. Beobachtungen bei der Grippe-Impfung mit einem Injector ohne Nadel [Observations in influenza vaccination with a needleless injector]. Zentralbl Arbeitsmed 1965 Oct;15(10):244-245.
- {Kogan1968} Kogan BA, Murray RA, Hanes B, Gross PA, Carson CC, Heidbreder GA, Glass LH. Mass measles immunization in Los Angeles County. Am J Public Health Nations Health. Oct 1968;58(10):1883-1890.
- {Kok1983} Kok P, Kenya P, Ensoring H. Measles immunization with further attenuated heat-stable measles vaccine using five different methods of administration. Trans R Soc Trop Med Hyg 1983;77:171-176.
- {Korol'kov1994} Korol'kov VF, Furgal SM, Ishkil'din MI. Strategii i osnovnye napravleniia optimizatsii immunoprofilaktiki v voiskakh. [The strategy and basic trends in optimizing immunoprophylaxis among the troops]. Voenno-meditsinskii Zhurnal [Military Medical Journal] (Russia) . Mar 1994;(3):35-9, 79 (UI: 94249181, PMID: 8191689).
- {Koroteev1980} Koroteev AV, Dement'eva NN, Zavrazhnaia TA, Gigauri VS, Tentsova AI. Kontsentratsiia novokaina i promedola v krovi eksperimental'nykh zivotnykh pri bezygol'nom i igol'no-shpritsedom sposobakh vvedeniia [Novocaine and promedol concentrations in the blood of experimental animals with jet and needle-syringe methods of administration]. Anesteziol Reanimatol (Russia) Aug 1980;(4):21-3.
- {Kovacs1982} Kovacs AD. Clinical experience with use of a jet injector for paracervical blocks in office practice. Obstet Gynecol. 1982;59(3):373-4.
- ~R 2003Aug22 {Krantz1959} Krantz A. L'injecteur sans aiguille Dermo-Jet. Presse Médecine (France) 1959;67;1807-?????
[Check volume no. when article arrives.]
- {Krag1999} Krag D, Moffat F. Nuclear medicine and the surgeon. Lancet 1999;354:1019-1022.
- {Krantz1960} Krantz A. Der Druck-Injector "Dermo-Jet". Münchener Medizinische Wochenschrift 1960;102:2034-2035.
- {Krantz1970} Krantz A. Un injecteur sans aiguille pour vaccination de masse [Needleless injector for mass vaccination]. Presse Méd (France) 14 Feb 1970;78(8):383.
- {Kremer1970} Kremer MG. Jet vaccination [letter]. Brit Med J 1970;4:303.
- {Kurz1983} Kurz KH, Meier-Oehlke P. Jet injection--local anesthesia for fitting and removal

of IUDs. *Contracept Deliv Syst* Jan 1983;4(1):27-32.

{Kutscher1962} Kutscher AH, Hyman GA, Zegarelli EV, Dekis J, Piro JD. A comparative evaluation of the jet injection technique (Hypospray) and the hypodermic needle for the parenteral administration of drugs: a controlled study. *Am J Med Sci* 1962;54:418-420.

~R {Kutscher1964a} Kutscher AH, Zegarelli EV, Cain EV, Portway TW, et al. The jet injection technique as a means of obtaining oral mucosal anesthesia (Part II). *J Oral Surg* 1964;18:464-465.

~R {Kutscher1964b} Kutscher AH, Zegarelli EV, Cain EV, Portway TW, et al. Jet injection as a means of obtaining oral mucosal anesthesia: a preliminary report. *J Oral Surg* 1964;22:310-???

~R {Kutscher1967} Kutscher A, Zegarelli E, Seldin L; Corwin R. Dosage-deliverance reliability with a jet injection instrument. *Military Medicine* March 1967;132:224-225.

{Labusquière1970} Labusquière R. Nouvelle stratégie dans la lutte contre la tuberculose pulmonaire [New strategy for the prevention of pulmonary tuberculosis]. *Afrique Médecine* 1970;10(86):31-40.

{Labusquière1971} Labusquière R, Dutertre J, Boisson P. Entretien des Ped-O-Jets [Maintenance of Ped-O-Jets]. *Afrique Médecine* 1971;10:46.

{Labusquière1972} Labusquière R. Associations vaccinales et organisation des campagnes de vaccination dans leur rapport avec la lutte antituberculeuse [Combined vaccines and organization of vaccination campaigns and their relation to antituberculous prevention]. *Médecine Tropicale (Marseilles)* Jan-Feb 1972;32(1):55-70.

{Lachapelle1982a} Lachapelle J-M, Tennstedt D, Lauweryz R, Cromphaut P, Armijo F. Release of nickel into fluids stored in the reservoir of Dermo-Jets. *Contact Dermatitis* May 1982;8(3):122-127.

{Lachapelle1982b} Lachapelle J-M, Tennstedt D. An anatomico-clinical study of delayed skin allergic reactions to nickel following intradermal injections of lidocaine with a Dermo-jet. *Contact Dermatitis* May 1982;8(3):193-199.

{Lachapelle1982c} Lachapelle JM, Tennstedt D, Burtonboy G. Tatouages permanents consécutifs a des injections par Dermo-Jet®: Étude anatomoclinique. A propos de cinq observations [Permanent tattoos following injections with Dermo-Jet®: anatomoclinical study. About 5 cases]. *Ann Dermatol Venereol (France)* 1982;109(11):939-946.

[tattoo adverse events from rubber component of device]

{Lachapelle1985} Lachapelle JM, Tennstedt D. Le Mesoflash expose-t-il aux mêmes effets secondaires indésirables que le Dermo-jet? [Does Mesoflash induce the same side effects as

Dermo-jet? (letter)]. *Ann Dermatol Venereol (France)* 1985;112(6-7):547.

{Lambrianidis1980} Lambrianidis T, Rood JP, Sowray JH. Dental anesthesia by jet injection. *Br J Oral Surg* 1980;17:227-231.

{Lamm198} Lamm J, Niebyl P, Hood A. Histologic artifact due to Madajet [letter]. *Arch Dermatology* 1985;121:835-836.

[MadaJet]

{Lane1966} Lane KE. Clinical evaluation on plantar keratosis using the Dermo-Jet. *J Am Podiatry Assoc* 1966 Aug;56(8):373-375.

~R {Larrick1949} Larrick LE, Thompson RG. The Hypospray and its relationship to dermatology: preliminary report. *J Invest Dermatol* 1949;13:361-370.

{Lawton1964} Lawton RL. Jet injection of drugs into malignant neoplasms. *Cancer Chemotherapy Rep* 1964;37:57-58.

~R ?? *ID ?? {Lefèvre1967} Lefèvre M, Gateff C. Etude de la vaccination directe par le BCG en Haute-Volta: Comparaison de deux vaccins intradermiques [A study of direct BCG vaccination in Upper Volta: Comparison between two intradermal vaccines]. *Bull World Health Organ* 1967;36(5):771-790.

[ARTICLE NOT YET CONFIRMED AS "NEEDLE-FREE"]

{Lebedinskii1979} Lebedinskii VA, Chicherin IuV, Evstigneev VI, Paramonov VE, Timofeev VV. (Russian title pending) [Assessment of the effectiveness of different methods of immunization with live plague vaccine EB in aerosol infections] *Zh Mikrobiol Epidemiol Immunobiol* 1979 Sep;(9):11-4 PMID: 115183).

{Lekie1971} Lekie R. La campagne d'éradication de la variole en République du Zaïre [The smallpox eradication campaign in the Republic of Zaïre]. *Bull Soc Pathol Exot Filiales*. Sep-Oct 1971;64(5):761-75.

~R {Lemarinier1971} Lemarinier G. Adénites post-vaccinales dues au BCG administré par Ped-O-Jet. Rapport final de la 6ème Conférence Technique de l'OCEAC [Organisation de Coordination pour la Lutte Contre les Grandes Endémies en Afrique Centrale], Yaoundé 10-13 March 1971, OCEAR edit., pp. 528-534.

{Lemon1983} Lemon SM, Scott RM, Bancroft WH. Subcutaneous administration of inactivated hepatitis B vaccine by automatic jet injection. *J Med Virol* 1983;12:129-136.

{Lemon1984} Lemon SM, Miller RN, Pang LW, Prier RE, Bernard KW. Failure to achieve predicted antibody responses with intradermal and intramuscular human diploid cell rabies vaccine. *Lancet* 1984 May 19;1(8386):1098-100.

{Lenz1966} Lenz TR. Foreign body granuloma caused by jet injection of tetanus toxoid.

Rocky Mountain Med J 1966;63:48.
[Hypospray®]

{Lev1972} Lev MI, Sergeichik II, Kulikov IA. Sravnitel'naia otsenka bezygol'nogo, shpritshevogo i skarifikatsionnogo metodov privivok [Comparative evaluation of the needleless, syringe and scarification methods of vaccination]. Voen Med Zh. Sep 1972;9:55-57 (PMID: 4660252).

{Levina1988} Levina LA, Filippov IuV, Vartanian IuP, Ratiner IuA, Salov VF. Polevoi opyt s meningokokkovoi zhidkoi polikomponentnoi vaktinoi ABC [A field trial with the liquid multicomponent meningococcal vaccine ABC] Zh Mikrobiol Epidemiol Immunobiol Nov 1988;(11):62-64 (PMID: 3146194).

{Lieske1990} Lieske CN, Lukey BJ, Hayward IT, Gepp RT, Meyer HG. Intramuscular administration of atropine in the rat: jet spray versus conventional needle injection. Biopharmaceutics and Drug Disposition 1990;11:207-213.

{Linder1979} Linder HG, Magnusson B. Testing of jet injectors; SP Project 7841.20. Stockholm: Statens Provningsanstalt [National Testing Institute], Department Stockholm, Laboratory for Mechanical Testing. Report submitted 26 October 1979 to Ralph H. Henderson, WHO/EPI.

[Bench laboratory testing of Ped-O-Jet, Med-E-Jet, Hyjettor, and Hypospray multi-use-nozzle jet injector devices. Cited in WHO1980).

{Lindmayer1986} Lindmayer I, Menassa K, Lambert J, Moghrabi A, Legendre L, Legault C, Letendre M, and Hallé J-P. Development of new jet injector for insulin therapy. Diabetes Care May-June 1986;9(3): 294-297.

{Lindsay} Lindsay L, Chen RT. The safety of multi-dose jet injection as a viable method of vaccine administration. (Draft manuscript).

{Lindsay1996} Lindsay L. *Assessing the Safety of Multidose Jet Injectors for the Administration of Vaccines* (Report submitted in partial fulfillment for the degree of Master of Public Health). Atlanta: Rollins School of Public Health, Emory University, 1996.

{Lipson1958} Lipson MJ, Carver DH, Eleff MG, Hingson RA, Robbins FC. Antibody response to poliomyelitis vaccine administered by jet injection. Am J Public Health 1958;48(5):599-603.

{Livingston1995} Livingston JB, Lu S, Robinson HL, Anderson DJ. The induction of mucosal immunity in the female genital tract using gene-gun technology. Ann NY Acad Sci 1995 Nov 27;772:265-7.

{Lloyd1998} Lloyd JS, Aguado MT. Pre-filled monodose injection devices: a safety standard for new vaccines, or a revolution in the delivery of immunizations? Geneva: World Health Organization, Global Programme on Vaccine and Immunization, document, May 1998;1-23.

[Available at: http://www.who.int/vaccines-access/Restructuring/PDF_files/prefill.pdf]

{Lloyd2000} Lloyd J. Technologies for vaccine delivery in the 21st century. Geneva: World Health Organization, Department of Vaccines and Biologicals, 2000, document WHO/V&B/00.35, pp. 1-25.

[Available at: <http://www.who.int/vaccines-documents/DocsPDF00/www554.pdf>]

~R {Locke1958} Locke RK. Corticosteroid injections in the foot. J Am Podiatric Assoc 1958;48:505-###.

{Logwin1996} Logwin S, Conget I., Jansa M., et al. Human insulin-induced lipotrophy: successful treatment using a jet-injection device. Diabetes Care, March 1996;19(3):255-6.

{Loktev1980} Loktev NA, Pilipenko VG, Basilova GI, Shchedrin VI, Lunina EA. Bezygol'naiia immunizatsiia assotsirovannoi vaksinoi protiv chumy, tuliaremii i sibirskoi iazvy [Jet immunization with polyvalent vaccine against plague, tularemia, and anthrax]. Zh Mikrobiol Epidemiol Immunobiol. June 1980;(6):109-110 (PMID: 7445856).

{Luby1968} Luby JP, Kaiser RL, Herring LL, Dull HB. Jet injector tuberculin skin testing: a comparative evaluation. Quantitative aspects. Am Rev Respir Dis 1968;97:46-53.

{Lukin1997} Lukin EP, Evstigneev VI, Makhlai AA, Mikhailov VV, Pashanina TP. Bezygol'nye in'ektsii i "shpritsevye" infektsii [Needle-free injections and "needle-transmitted" infections]. Voенно-медицинский Журнал [Military Medical Journal] (Russia) Mar 1997;318(3):48-52 (UI: 97257400, PMID: 9157697).

[Lukin1997 tested transmissibility of virulent "Trinidad" strain of Venezuelan Equine Encephalitis virus in lab animals - guinea pigs, rabbits, and monkeys using stock and modified BI-19, BI-1M and BI-3 jet injector models. Following a total of 534 injections into infected animals followed by 534 injections into a paired uninfected one, 15 (2.8%) uninfected injection recipients became infected with VEE. Transmission did not occur at virus concentrations in donor rabbits of 4.5IgDL₅₀/mL and dose volumes of 0.1 to 0.2 mL, but did occur when dose volumes were ≥0.5 mL. At virus concentrations of 6.0IgDL₅₀/mL in the donor animal, transmission occurred regardless of volume injected. Modification of the devices BI-19 and BI-1M with "rubber caps" and BI-3 injector with a changed angle of jet penetration resulted in no transmission of infection, even with concentrations up to 7.0IgDL₅₀/mL and volumes up to 1.0 mL.]

{Lundholm1999} Lundholm P; Asakura Y; Hinkula J; Lucht E; Wahren B. Induction of mucosal IgA by a novel jet delivery technique for HIV-1 DNA. Vaccine 1999 Apr 9;17(15-16):2036-2042.

{Lundholm2002} Lundholm Peter, Leandersson A-Ca, Christensson Birger, Bratt G, Sandström E, Wahren B. DNA mucosal HIV vaccine in humans. Virus Research 2002;82:141-145.

[Syrijet Mark II]

{Lysakowski2003} Lysakowski C, Dumont L, Tramer MR, Tassonyi E. A needle-free jet-injection system with lidocaine for peripheral intravenous cannula insertion: a randomized controlled trial with cost-effectiveness analysis. *Anesth Analg*. Jan 2003;96(1):215-9.

[J-Tip[®]]

{Malone1986} Malone JJ, Lowitt S, Grove NP, Shah SC. Comparison of insulin levels after injection by jet stream and disposable insulin syringe. *Diabetes Care* 1986;9:637-640.

[Medi-Jector]

{Marennikova1972} Marennikova SS, Shelukhina EM, Fedorov VV, Chimishkian KL, Shironin LI. Otsenka effektivnosti revaktsinatsii protiv ospy bezygol'nym metodom [Evaluation of the effectiveness of revaccination against smallpox by the jet injection method]. *Zh Mikrobiol Epidemiol Immunobiol (Russia)* Aug 1972;49(8):28-34.

~R {Margetis1958} Margetis P, Quarantillo E, Lindberg R. Jet injection of local anaesthesia in dentistry. *U.S. Armed Forces Med J*. 1958;9:625-634.

{Marsallon1972} Marsallon, Magnin, Jego, Richer. Intradermo-réaction tuberculinique et vaccination B.C.G. intradermique par injecteur à jet sous pression [Tuberculin intradermo-reaction and intradermal B.C.G. vaccination by pressure jet injector]. *Rev Corps Santé Armées Terre Mer Air (France)* Feb 1972;13(1):57-61.

{Marston1978} Marston, J.A., and Pye, R.J. BCG Abscess a Complication of Jet Injection Vaccination. *Practitioner* April 1978, 220, 625-626

{Martin1998} Martin D. Sharpen your technique for needle-free injection. *Nursing*. July 1998;28(7):52-3.

{Martin-du-Pan1966} Martin Du Pan R. La vaccination contre la variole par le «Dermo-Jet» [Vaccination against smallpox by the "Dermo-Jet"]. *Infektionskrankheiten: IV. Internationaler Kongreß für Infektionskrankheiten [IV International Congress on Infectious Diseases]*, 26-30 April 1966, Munich, Germany. Eds: Mössner G, Thomssen R. Stuttgart: F.K. Schattauer-Verlag GmbH, 1967, pp. 843-846.

[smallpox vaccination]

{Martins1979} Martins JK, Roedl EA. Medijector - A new method of corticosteroid-anesthetic delivery. *J Occup Med* 1979;21(12):821-824.

*ID {Masseyeff1967} Masseyeff R, Seck I, Rey M, Triau R. Études radio-immuno-electrophoretiques de developpement des anticorps seriques après vaccination antitetanique - Application au controle d'une nouvelle methode de vaccination [Radio-immuno-electrophoretic study of the development of serum antibodies after antitetanus vaccination. Use in the control of a new method of vaccination]. *Bulletin de la Société Médicale d'Afrique Noire de Langue Française* 1967;12(2):240-247.

{Matheï1997} Matheï C, Van Damme P, Meheus A. Hepatitis B vaccine administration: comparison between jet-gun and syringe and needle. *Vaccine* 1997 March;15(4):402-4.

~~{Matsuoka2003} Matsuoka H, Nishio W, Sakamoto T, Harada H, Yoshimura M, Tsubota N. Selective segmental jet injection to distinguish the intersegmental plane using jet ventilation. Japanese Journal of Thoracic & Cardiovascular Surgery. Aug. 2003;51(8):400-401.~~

[NOT jet injection. Describes use of *high-frequency (oscillation) jet ventilation* normally used to treat patients with respiratory insufficiency. The nozzle from which the gas is administered by the equipment is sometimes referred to as the “jet injector”.]

{McBean1972} McBean AM, Agle AN, Compaore P, Foster SO, McCormack WM. Comparison of intradermal and subcutaneous routes of cholera vaccine administration. *Lancet* 1972 March 4;1(7749):527-9.

{McConnell1975} McConnell S, Whitford HW. Jet injection in veterinary medicine. *Proc Annu Meet U S Anim Health Assoc* 1975;(79):180-185.

{McIntosh1977} McIntosh K, Orr I, Andersen M, Arthur JH, Blakeman GJ. Response of normal children to influenza A/New Jersey/76 virus vaccine administered by jet injector. *J Infect Dis* 1977;136 Suppl:S584-7.

{McKenzie1978} McKenzie R, Shaffer WL. A safer method for paracervical block in therapeutic abortions. *Am J Obstetr Gynecol* 1978;130:317-320.

{McKenzie1982} McKenzie, R. New technology: clinical applications of jet injection. *New Zealand Med J* 1982;95(720):815-817.

~R {Mehregan1966} Mehregan AH, Pinkus H. Artifacts in dermal histopathology. *Arch Derm* 1966;94:218-???

{Medunitsin1999} Medunitsin NV. [Chapter 6.2: Needle-free injection method of vaccination.] In: Medunitsin NV, Vaktsinologia [Vaccinology]. Moscow: Triad-X, Success Publishing House, 1999;87-88 (ISBN 5-8949-0008-6).

[Method new since 1950s. Used for mass immunization in general population and military. Advantages: increased capacity, decreased risk of bloodborne disease transmission, decreased pain. Disadvantages: increased reaction to adsorbed vaccines due to alum remaining in upper layers of skin. Different types of injectors available with capacities up to 1,000 - 1,500 injections per hour. Most widely used jet injector in Russia is the BI-3M model with “anti-infection protector” PPN-2, delivering 0.5 cm³ volume.]

~R {Melemuka1973} Melemukha IV, Gigauri VS, Smoliarov BV, Sarkisian RS. Mediko-tehnicheskie osobennosti vvedeniia lekarstvennykh preparatov struinym sposobom v steku trakhei i bronkhov [Medical and technical characteristics of administering drugs via jet into the tracheal and bronchial walls]. *Med Tekh (Russia)* 1973 May-Jun;3:42-44.

- ~R {Melemuka1974} Melemuka IV, Gigauri VS, Smolyarov BV, Sarkisyan RS. Biomedical engineering characteristics of the injection of drug preparations by the jet method into the wall of the trachea and bronchi. *Biomed Eng (New York)* 1974 Mar;7(3):172-174.
- {Mendosa1998} Mendosa, R. The Jet Injector Paradox. *Diabetes Wellness Letter* February 1998;;1-3 [<http://www.mendosa.com/injector.htm>].
- {Mérieux1967} Mérieux C. Single shot primovaccination against tetanus by needleless injectors. In: Echmann L. (ed.), *Principles on Tetanus. Proceedings, International Conference on Tetanus, 15-19 July 1966. Bern, Switzerland*. Bern: Verlag Hans Huber, 1967;423-436.
- {Meyer1964} Meyer HM, Hostetler DD, Bernheim BC, Rogers NG, Lambin P, Chassary A, Labusquière R, Smadel JE. Response of Volta children to jet inoculation of combined live measles, smallpox and yellow fever vaccines. *Bull World Health Organ* 1964, 30, 783-794.
- {Meyer1965} Meyer HM, Bernheim BC, Rogers NG. Titration of live measles and smallpox vaccines by jet inoculation of susceptible children. *Proceedings of the Society for Experimental Biology and Medicine* January-April 1965;118:53-57.
- {Middaugh1979} Middaugh JP. Side effects of diphtheria-tetanus toxoid in adults. *Am J Public Health* March 1979;69(3):246-249.
- {Miglets1974} Miglets AW, Kelly DR, Gebhart DE. An attachment for the Dermo-jet suitable for use through a laryngoscope. *Trans Am Acad Ophthalmol Otolaryngol* Jul-Aug 1974;78(4):ORL283-ORL284.
- {Mihailescu1978} Mihailescu R, Strati I, Chirescu N, Cuteanu I, Raducanu S, Popescu-Pretor I. Determinarea eficientei de pindere a vaccinului antivariolic lificat în functie de tehnica de vaccinare [Determination of the efficiency of the lyophilized smallpox vaccine in terms of the vaccination technique (double scarification, multipuncture, jet injection)]. *Bacteriol. Virusol. Parazitol. Epidemiol. (Romania)* 1978;23:79-??.
- {Mihailescu1989} Mihailescu R, Dimache G, Velea V, Stoean C, Croitoru M, Durbaca S, Chirescu N. La capacité immunogène de l'antigène soluble «vaccinia» (vaccin fractionné antivariolique) administré simultanément avec le vaccin typhoïdique inactivé et avec l'anatoxine tétanique purifiée et concentrée [The immunogenic capacity of soluble "vaccinia" antigen (fractionated smallpox vaccine) administered simultaneously with inactivated typhoid vaccine and with purified and concentrated tetanus anatoxin]. *Arch Roum Pathol Exp Microbiol (Romania)* Apr-Jun 1989;48(2):151-156.
[Dermo-jet]
- ~R {Milonov1976} Milonov OB; Gigauri VS; Knyazeva GD; Mlynchik VE; Gotie SV; Kocharyan EZ; Babur AA. Primenenie kleia MK-6 i bez'igol'nogo sposoba vvedeniia veshchestv v khirurgii pecheni [Use of MK-6 glue and jet method of its administration in liver surgery]. *Khirurgiia (Mosk) (Russia)* Jan 1976;(1):24-29.

{Millar1965} Millar JD, Roberto RR. Vacunación antivariólica por inyección a presión. El Hospital (América Clínica) 1965;45:14.

{Millar1969a} Millar JD, Foege WH. Status of smallpox eradication (and measles control) in West and Central Africa. J Infect Dis 1969;120:725-732.

{Millar1969b} Millar JD, Roberto RR, Wulff H, Wenner HA, and Henderson DA. Smallpox vaccination by intradermal jet injection. Introduction, background and results of pilot studies. Bull World Health Organ 1969;41:749-760.

{Millar1971} Millar JD, Morris L, Macedo-Filho A, Mack TM, Dyal W, Medeiros AA. The introduction of jet injection mass vaccination into the national smallpox eradication program of Brazil. Tropical and Geographical Medicine 1971;23:89-101.

{Mironov1979} Mironov AI, Kozhemiaka NV. Poluavtomaticheskii in"ektor IP-1 [Semi-automatic injector IP-1]. Veterinariia 1979 Sep;(9):38-9.

{Moffat1970} Moffat M, Cook R. Report on the Ankole BCG DermoJet trial (mimeo). Kampala, Uganda: Department of Paediatrics, PO Box 7072, Kampala, Uganda, 1970 (cited in Stanfield1972)

{Mohammed1981} Mohammed I, Zaruba K. Control of epidemic meningitis by mass vaccination. Lancet 1981;2(8237):80-83.
[Ped-O-Jet®]

~R {Mohammed1984} Mohammed I, Obineche EN, Onyemelukwe GC, Zaruba K. Control of epidemic meningococcal meningitis by mass vaccination. I. Further epidemiological evaluation of groups A and C vaccines in northern Nigeria. J Infect 1984;9(2):190-6.

{Monroe1992} Monroe CD, Thomas K, Sands J. Evaluation of the Biojector® Injection Management System (Needle-Free Drug Delivery) For Healthcare Worker Acceptance and Patient Tolerance. 1992 Frontline Healthcare Workers: A National Conference on Prevention of Device-mediated Bloodborne Infections. Poster abstract [no.???].

~R {Morse1967} Morse DC, Hall A, Kaluzny A, Runde RH. Comparative tuberculin testing. Intradermal gun versus intradermal needle. Amer Rev Resp Dis 1967;96:107-110.
[photo of nozzles of HypoSpray and Ped-O-Jet ID nozzles]

{Mott1973} Mott MG, Stevenson PA. The use of the Syrijet to attain local anaesthesia in children with acute leukaemia. Br J Clin Pract 1973;27(11):415-416.

{Mott1974} Mott MG, Stevenson PA. Jet anesthesia for minor procedures in childhood leukemia. Clin Pediatr (Phila.) 1974;13(12):1024-6.

- {Moynahan1965} Moynahan EJ, Bowyer A. Development of jet injection and its application to intralesional therapy in dermatology. *Brit Med J* 1965;5477:1541-1543.
- {Mumford1976a} Mumford DM, Jackson PL. Jet injection anesthesia for tissue culturing of biopsies of the skin. *Surg Gynecol Obstet.* 1976;143(6):975-6.
- {Mumford1976b} Mumford DM, Jackson PL. The successful use of jet anesthetic injections with childhood lacerations. *Clin Pediatr (Phila.)* 1976;15(10):872-4.
- {Munshi2001} Munshi AK, Hegde A, Bashir N. Clinical evaluation of the efficacy of anesthesia and patient preference using the needle-less jet syringe in a pediatric dental practice. *J Clin Pediatr Dent* 2001;25:131-136.
[MadaJet]
- {Nathan1986} Nathan CF. Local and systemic effects of intradermal recombinant interferon-gamma in patients with lepromatous leprosy. *N Eng J Med* July 1986;315(1):6-15.
- {Naumann1998} Naumann M, Bergmann I, Mofmann U, Hamm H, Reiners K. Botulinum toxin for focal hyperhidrosis: Technical considerations and improvements in application. *Br J Dermatology* 1998;139:1123-124.
- {Neff1969} Neff JM, Millar JD, Roberto RR, Wulff H. Smallpox vaccination by intradermal jet injection. Part III - Evaluation in a well-vaccinated population. *Bull WHO* 1969;41:771-778.
- {NeufeldPD1977} Neufeld PD, Katz L. Comparative evaluation of three jet injectors for mass immunization. *Can J Public Health* November/December 1977;68:513-516.
- {NeufeldND1997} Neufeld ND. Precision of low-dose insulin administration using the jet-injector. unpublished clinical study, 1997. Document distributed by Activa® Brand Products, 36 4th Street, Charlottetown, PE, Canada.
- {Neumann1973} Neumann G. Tuberkulinproben bei Erwachsenen. Vergleich von Jet-Injektion (Hypospray) und Stempeltest (Tubergen) [Tuberculin tests in adults. Comparison between jet-injection (Hypospray) and tine technic (Tubergen)]. *Prax Pneumol (Germany)* Jun 1973;27(6):337-346.
- {Nikiforov1974} Nikiforov VN, Shcherbak IuF, Gigauri VS, Koroteev AV, Kushnareva TO. Bezygol'nyi sposob provedeniia novokainovoi blokady pri radikulitakh u bol'nykh khronicheskim brucellosem [Needleless method of administering a novocaine block in radiculitis in chronic brucellosis patients]. *Sov Med* 1974;0(4):148.
- {Oberye2000} Oberye J, Mannaerts B, Huisman J, Timmer C. Local tolerance, pharmacokinetics, and dynamics of ganirelix (Orgalutran) administration by Medi-Jector compared to conventional needle injections. *Hum Reprod* Feb 2000;15(2):245-249.

~R ?? *ID?? {Panja1947} Panja G, Das N. Immunity after intradermal inoculation of cholera vaccine. *Indian J Med Res* 1947;85:3-6.

[ARTICLE NOT YET CONFIRMED AS "NEEDLE-FREE"]

{ParentduChâtelet1997} Parent du Châtelet I, Lang J, Schlumberger M, Vidor E, Soula G, Genet A, Standaert SM, Saliou P, Imule Investigators Group. Clinical immunogenicity and tolerance studies of liquid vaccines delivered by jet-injector and a new single-use cartridge (Imule®): comparison with standard syringe injection. *Vaccine* 1997;15(4):449-458.

[Mini-imojet]

~R {Parish1967} Parish LC, Witrowski JA. The enigma of acne therapy: the acne abscess. *Am J Med Sci* December 1967;254(6):769-776.

{Parker1984} Parker V. Jet Gun or Syringe? A trial of alternative methods of BCG vaccination. *Public Health London* 1984;98(6):315-320.

{Partsch1997} Partsch C-J, von Büren E, Kühn B, Sippell WG, Brinkmann G. Visualization of injection depot after subcutaneous administration by syringe and needle-free device (Medi-Jector): first results with magnetic resonance imaging. *Eur J Pediatr* 1997;156:893-898.

{Paul1978} Paul SS, Nath KR, Chhabra AK, and Verma M. Comparison of BCG inoculation by conventional intradermal and jet methods. *Indian Pediatrics* April 1978;15(4):341-347.

{Payler1974} Payler DK, Skirrow, MB. Intradermal influenza vaccination. *British Med Journal* 1974;2:727.

{Ped-O-Jet-International1991} Ped-O-Jet International. Instructions for the operation and maintenance of the Hypodermic Jet Injection Apparatus, Ped-O-Jet® (foot operated) [Model POJ, NSN 6515-00-910-0097, rev. date 070191]. Cherry Hill, NJ 08002, USA: Ped-O-Jet International, 616 Hollywood Avenue, pp. 1-0 - 6-5.

{Pehling1984} Pehling GB, Gerich JE. Comparison of plasma insulin profiles after subcutaneous administration of insulin by jet spray and conventional needle injection in patients with insulin-dependent diabetes mellitus. *Mayo Clin Proc* 1984;59:751-754.

{Pepall1981} Pepall L. A report on research and conclusions on the Medejet local analgesia gun, carried out at the Victoria Clinic, Romford. *Chiropody Review (UK)* Nov-Dec 1981;38(6)

{Perel'man1976} Perel'man MI, Gigauri VS, Kniazeva GD, Safarov I. Kleevoi sposob germetizatsii legkogo s pomoshchiu bezygol'nogo in"ektora [Adhesive technic of lung closure with aid of a jet injector]. *Khirurgiia (Mosk)* 1976 Oct;(10):116-119.

~R {Perkin1950} Perkin FS. Jet injection of insulin in treatment of diabetes mellitus. *Proc Amer Diabetes Assoc* June 1950;10:185-199.

[Hypospray, photo]

{Perriello1985} Perriello G, De Feo P, Ventura MM, De Cosmo S, Lolli C, Pippi R. Jet insulin improves postprandial glycemic control in IDDM. American Diabetes Association 45th Annual Meeting, Baltimore, 16-18 June 1985, Diabetes 1985;34(Suppl1a):116a(abstract no. 459).

{Perriello1986} Perriello G, De Feo P, Ventura MM, Calcinaro F, Dell'Olio A, Lolli C, Pietropaolo M, Santeusanio F, Bolli GB, Brunetti P. Pharmacokinetics and action of insulin administered by a jet injector in type I diabetes mellitus. Second Assisi International Symposium on Advanced Models for the Therapy of Insulin-Dependent Diabetes 20-23 April 1986;97-103.

{Perry1977a} Perry HT, Cohn BT, Nauheim JS. Accidental intraocular injection with Dermojet syringe [letter]. Arch Dermatol Aug 1977;113(8):1131.

{Perry1977b} Perry HD, Nauheim JS, Cameron CD. Intravitreal injections by a Dermojet syringe. Ann Ophthalmol Jun 1977;9(6):737-740.

~R {Pertmer1995} Pertmer TM, Eisenbraun MD, McCabe D, Prayaga SK, Fuller DH, Haynes JR. Gene gun-based nucleic acid immunizations: elicitation of humoral and cytotoxic T-lymphocytes responses following epidermal delivery of nanaogram quantities of DNA. Vaccine 1995;13:1427-30.
[Helios™ precursor]

{Peter2002} Peter DJ, Scott JP, Watkins HC, Frasure HE. Subcutaneous lidocaine delivered by jet-injector for pain control before IV catheterization in the ED: the patients' perception and preference. Am J Emerg Med. Oct 2002;20(6):562-6.

{Petrovskii1975} Petrovskii BV; Gigauri VS. Primenenie bez'igol'nykh in'ektorov v meditsinskoi praktike [Use of jet injectors in medical practice]. Klin Med (Moscow Russia) 1975 Jun;53(6):11-15.

{Phero1998} Phero JC. Subcutaneous administration of midazolam: a comparison of the Bioject jet injector with the conventional syringe and needle [discussion]. J Oral Maxillfac Surg 1998;56:1254.

{PhilippinesCholeraCommittee1973} Philippines Cholera Committee. A controlled field trial on the effectiveness of the intradermal and subcutaneous administration of cholera vaccine in the Philippines. Bull World Health Organization 1973;49(4):389-94.

{Pietschmann1964} Pietschmann H. Erfahrungen mit dem "Hypospray Jet Injector" in der lokalen Prednisolon-Therapie rheumatischer Erkrankungen. Wiener Zeitschrift für innere Medizin und ihre Grenzgebiete (Austria) 1964;45:348-352.

{Pilipenko1974} Pilipenko VG, Miroshnichenko MA, Loktev NA. Immunizatsiia assotsirovannyimi di- i trivaktsinami protiv chumy, tuliaremii i sibirskoi iazvy pri pomoshchi bezygol'nogo in'ektora. Soobschenie I [Plague, tularemia and anthrax immunization with associated di- and trivaccines using a jet injector. I]. Zh Mikrobiol Epidemiol Immunobiol. May

1974;(5):59-64 (PMID: 4218042).

{Pluciennik1985} Pluciennik AM, de Rizzo E, Higashi HG, Konishi CK, Freitas ES, Veneziani P, Takabayashi Y, Esteves da Silveira EE. Reações locais e níveis de antitoxina circulante decorrentes de administração do toxóide tetânico. Estudo comparativo entre Ped-o-Jet e seringa hipodérmica [Local reactions and antitoxin circulating levels induced by the administration of tetanus toxoid. Comparative study between Ped-O-Jet and hypodermic syringe]. Rev Saúde Pública (Brasil) Jun 1985;19(3):201-214.

{Poland1997} Poland GA, Borrud A, Jacobson RM, McDermott K, Wollan PC, Brakke D, Charboneau JW. Determination of deltoid fat pad thickness. Implications for needle length in adult immunization. JAMA 1997;277:1709-1711.

{Polillio1997} Polillio AM, Kiley J. Does a needleless injection system reduce anxiety in children receiving intramuscular injections? Pediatric Nursing Jan-Feb 1997;23(1):46-9.

{Pollack1971} Pollack BF, Crasson W, Milling L. A comparison of dental jet injection syringes. N Y State Dent J 1971;37(10):618-21.

{Preston1951} Preston RH, Goldman L, Thompson RG. Use of the Hypospray® in dermatology. AMA Archives of Dermatology 1951;64:327-339.

{Price1989} Price JP, Kruger DF, Saravolatz LD, Whitehouse FW. Evaluation of the insulin jet injector as a potential source of infection. Am J Infect Control October 1989;17(5):258-263.

{Proksch1986} Proksch E. Pigmentierungen nach Benutzung eines Dermo-Jet-Druckinjektors [Pigmentation following the use of a Dermo-Jet pressure injector]. Dtsch Med Wochenschr (Germany) 25 April 1986;111(17):682.

{Puissegur1963a} Puissegur JA. Inyecciones sin aguja (intradérmicas y transcutáneas). Revista de la Sanidad Militar Argentina April-June 1963;62:136-140.

{Puissegur1963b} Puissegur JA. Inyecciones sin aguja (intradérmicas y transcutáneas). Gaceta Veterinaria (Argentina) August 1963;25:366-370.

{Puissegur1965} Puissegur JA. El "dermo-jet" inyector a presión sin aguja. Ensayos exitosos de eficacia y practicidad [The "Dermo-Jet" pressure injector without a needle. Successful tests of efficiency and practicality]. Revista de la Sanidad Militar Argentina Jul-Dec 1965;64(3):182-193.

[cites various human diagnostic and immunizing uses - diphtheria toxin Schick test, streptococcus toxin Dick test, epidemic typhus, plague, typhoid, paratyphoid; provides veterinary study data with arecoline antihelminthic in dogs.]

{Queralt1995} Queralt CB, Comet V Jr, Cruz JM, Val-Carreres C. Local anesthesia by jet-injection device in minor dermatologic surgery. Dermatol Surg 1995 Jul;21(7):649-651.

{Rankin1966} Rankin TJ, Good AE. Corticosteroid injection of small joints by Hypospray. *Arthritis and Rheumatism* 1966;9(4):611-619.

~R {Rayman1989} Rayman G, Walker R, Day JO. Patient experience with a jet injector. *Diabetic Medicine* 1989;6:274-276.
[Vitajet]

{Ready1983} Ready LB, Kozody R, Barsa JE, Murphy TM. Trigger point injections vs. jet injection in the treatment of myofascial pain. *Pain* 1983 Feb.;15(2):201-6.

{Reimer1994} Reimer S. Anestesi med jetinjeksjon. Bruk av Medi-Jector EZ dermojet til anestesi ved smakirurgi [Anesthesia with jet injection. Use of Medi-Jector EZ dermojet for anesthesia in minor surgery]. *Tidsskr Nor Laegeforen (Norway)* 1994 May 30;114(14):1627-1629.

{Reis1998} Reis EC, Jacobson RM, Tarbell S, Weniger BG. Taking the sting out of shots: control of vaccination-associated pain and adverse reactions. *Pediatric Annals* 1998;27:375-385.

{Ren2002} Ren S, Li M, Smith JM, DeTolla LJ, Furth PA. Low-volume jet injection for intradermal immunization in rabbits. *BMC Biotechnology*. 23 May 2002;2(1):10
[<http://www.biomedcentral.com/1472-6750/2/10>].

[EMS/MPM, Helios]

{Resman1985} Resman Z, Metelko Z, Skrabalo Z. The application of insulin using the jet injector DG-77. *Acta Diabetol Lat* 1985;22(2):119-125.

{Rey1965a} Rey M, Baylet R, Cantrelle P, Dauchy S, Diop Mar I, Guerin M. Vaccination contre la rougeole en milieu rural sénégalais par un vaccin vivant suratténué (Schwarz) au moyen d'un injecteur sans aiguille (Dermojet). Possibilités d'association avec le vaccin [Vaccination against measles in a rural Senegalese environment with overattenuated live vaccine (Schwarz) by means of an injector without a needle (Dermojet). Possibilities of interaction with vaccine]. *Bull Société Médicale d'Afrique Noire de Langue Française*. 1965;10(3):392-406.

{Rey1965b} Rey M, Baylet R, Cantrelle P, Dauchy S, Diop Mar I, Guerin M. La vaccination contre la rougeole par vaccins vivants. Deux expériences en Afrique tropicale (Senegal). [Vaccination against measles by live vaccines. Two experiments in ptropical Africa (Senegal)]. *Presse Med* 1965;73(48):2729-2734.

{Rey1967} Rey M, Triau R. Essais de primo-vaccination antitétanique en un temps avec une anatoxine concentrée inoculée par injecteurs sans aiguille (Note préliminaire) [Trial of a single antitetanus primary vaccination with a concentrated antitoxin inoculated without needle injectors (preliminary note)] *Bulletin de la Société Médicale d'Afrique Noire de Langue Française*. 1967;12(2):230-239.

[Dermo-Jet[®], Ped-O-Jet[®]]

{Rey1968} Rey M, Cantrelle P, Lafaix C, Diop Mar I, Sow A, Agboton Y. Enseignements

d'une campagne expérimentale de vaccination contre la rougeole en milieu urbain. [Lessons of an experimental campaign of vaccination against measles in the urban environment] Bulletin Société Médicale d'Afrique Noire de Langue Française. 1968;13(2):291-310

{Rey1972} Rey M, Triau R, Diop Mar I, Codija N, Sow A. Single shot tetanus immunization and its application to mass campaign. 3rd International Conference on Tetanus, São Paulo, Brazil, 17-22 August 1970. Washington, DC: Pan American Health Organization, Scientific Publication No. 253, 1972;:94-101.

[Ped-O-Jet®, Dermo-Jet®]

{Rey1973} Rey M, Diop Mar I, Gbezo P, Sow A. Vaccination de masse antitétanique en Afrique [Mass antitetanus vaccination in Africa]. La Nouvelle Presse médicale (France). 24 Feb 1973;2(8):514.

[Ped-O-Jet®]

{Rey1989} Rey JL, Soubiran G, Fayet MT, Triau R. Évaluation sérologique d'une campagne de vaccination antiméningococcique de masse au Niger. [Serological evaluation of an antimeningococcal mass vaccination campaign in Niger]. Bull Soc Pathol Exot Filiales (France) 1989;82(2):248-254.

[Imo-Jet (Mérieux)]

{Roberto1969} Roberto RR, Wulff H, Millar JD. Smallpox vaccination by intradermal jet injection. C. Cutaneous and serological responses to primary vaccination in children. Bull WHO 1969;41:761-769.

{Robertson1987} Robertson JS. Jet injectors and infection. Public Health May 1987;101(3):147-149.

{Robertson2000} Robertson KE; Glazer NB; Campbell RK. The latest developments in insulin injection devices. Diabetes Educ Jan-Feb 2000;26(1):135-8, 141-6, 149-152.

{Rodrigues1975} Rodrigues BA. Smallpox eradication in the Americas. Bull Pan Amer Health Organiz 1975;9:53-68.

{Rosenthal1967} Rosenthal SR. Transference of blood by various inoculation devices. Am Rev Respir Dis. October 1967;96(4):815-819.

[Author studied a program of tuberculin skin testing among school children who received intradermal 0.1 mL doses by either the Hypospray® K-3 jet injector or needle-syringes in which the needle -- but not the syringe -- were changed between patients. Using the benzidine method, blood capable of contaminating the next patients was detected from both within the syringes (1.2%) and on the injector nozzle (17%).]

{Rossier1968} Rossier E, Heiz R. Essai clinique d'un vaccin mixte contre la diphtérie le tétanos et la coqueluche, administré par voie intradermique au moyen du "Dermo-Jet" [Clinical trial of a mixed vaccine against diphtheria tetanus and whooping cough, administered intradermally by "Dermo-Jet"]. Schweiz Med Wochenschrift (Switzerland) Oct

1968;98(41):1602-1608.

{Ruben1973} Ruben FL, Smith EA, Foster SO, Casey HL, Pifer JM, Wallace RB,; Atta AI, Jones WL, Arnold RB, Teller BE, Shaikh ZQ, Lourie B, Eddins DL, Doko SM, Foege WH. Simultaneous administration of smallpox, measles, yellow fever, and diphtheria-pertussis-tetanus antigens to Nigerian children. Bull World Health Organ 1973;48(2):175-181.
[Ped-O-Jet]

{Rybakov1977} Rybakov AI; Konobevtsev OF; Azrel'ian BA; Gigauri VS; Panikarovskii VV. Razrabotka i vnedrenie v stomatologicheskuiu praktiku otechestvennykh bezygol'nykh in'ektorov [Development and introduction of Soviet-made jet injectors into dental practice]. Stomatologiya (Mosk) Nov-Dec 1977;56(6):22-25.

{Rybakov1979} Rybakov AI, Konobevtsev OF, Gigauri VS, Azrel'ian BA, Smoliarov BV. Stomatologicheskii statsionarnyi bezygol'nyi in'ektor [Stomatological stationary jet injector]. Stomatologiya (Moscow, Russia). 1979 Mar-Apr;58(2):31-3.

{Salanga1979} Salanga VD, Hahn JF. Traumatic ulnar neuropathy from jet injection: Case Report. J Trauma 1979;19(4):283-284.

{Saltykov1971} Saltykov RA, Nekrasov IL, Lesniak OT, Ulanova AA. (Russian title pending) [Experimental immunization with live anthrax STI vaccine using a needleless injector]. Zh Mikrobiol Epidemiol Immunobiol. May 1971;48(5):52-55 (PMID: 5560807).

{Samler1998} Samler C. New developments in disposable needle-free injectors. European Pharmaceutical Review September 1998; vol???, issue???, pp???

{Santangelo1973} Santangelo RG. Rapid, "painless" local anesthesia. J Pediatr. 1973;82(4):736.

{Saravia1991} Saravia ME, Bush JP. The needleless syringe: efficacy of anaesthesia and patient preference in child dental patients. J Clin Pediatr Dent 1991;15:109-112.

{Sarno2000} Sarno MJ, Blase E, Galindo N, Ramirez R, Schirmer CL, Trujillo-Juarez DF. Clinical immunogenicity of measles, mumps and rubella vaccine delivered by the Injex jet injector: comparison with standard syringe injection. Pediatr Infect Dis J. 2000 Sep;19(9):839-42.

{Sarphie1996} Sarphie D, Greenford J, Ashcroft SJH, Bellhouse BJ. Transdermal powdered delivery (TPD): *In vivo* determination of particle penetration depth and therapeutic efficacy. Proceedings of Fourth Percutaneous Penetration Conference 1996;4B.

{Sarphie1997} Sarphie D, Johnson B, Cormier M, Burkoth TL, Bellhouse BJ. Bioavailability following transdermal powdered delivery (TBD) of radiolabeled inulin to hairless guinea pigs. J of Controlled Release 1997;47:61-69.

{Sawamura1999} Sawamura D; Ina S; Itai K; Meng X; Kon A; Tamai K; Hanada K; Hashimoto I. In vivo gene introduction into keratinocytes using jet injection. *Gene Ther* Oct 1999;6(10):1785-1787.

{Saxon1996} Saxon, Wolfgang. Robert Andrew Hingson, 83, a pioneer in public health [newspaper obituary]. *New York: The New York Times*, 12 October 1966, late edition – final, section 1, page 52, column 5.

{Schlumberger1999} Schlumberger M; Parent du Châtelet I; Lafarge H; Genet A; Gaye AB; Monnereau A; Sanou C; Diawara L; Gueye Y; Lang J. Coût de l'injection d'anatoxine tétanique par injecteur sans aiguille (Imule) lors d'une vaccination collective au Senegal: comparaison avec l'injection par seringues et aiguilles restérilisables [Cost of tetanus toxoid injection using a jet-injector (Imule) in collective immunization in Senegal: comparison with injection using a syringe and resterilizable needle]. *Sante* 1999 Sep-Oct;9(5):319-326.

{Schön1965} Schön F. Die Düseninjektion in der Zahnheilkunde [Jet injection in dentistry]. *Zahnärztliche Welt* April 1965;66(8):274-285 (286?).

~R {Schmidt1966} Schmidt DA. Anesthesia by jet-injection in the practice of pedodontics. *J Dent Child*. November 1966;33(6):340-352.

~R {Schmidt1970} Schmidt DA. Jet injection: high speed infiltration anesthesia. *ASDC J Dent Child*. Nov-Dec 1970;37(6):459-462.

{Schneider1994} Schneider U, Birnbacher R, Schober E. Painfulness of needle and jet injection in children with diabetes mellitus. *Eur J Pediatr* 1994 Jun;153(6):409-10.

{Schön1965} Schön F. Die Duschinyektion in der Zahnheilkunde. *Zahnärztliche Welt* April 1965;66(8):274-285.

{Schramm2002} Schramm J, Mitragotri S. Transdermal drug delivery by jet injectors: energetics of jet formation and penetration. *Pharm Res* Nov 2002;19(11):1673-1679.
[Vitajet® 3]

{Schultz19??} Schultz WH, Fitzgerald A, Ferguson L, Lewis K, Leppert B, Ciocci G. Use of the Biojector® 2000 for Lidocaine® Injection prior to Lumbar Puncture and Bone Marrow Aspiration/Biopsy in the Pediatric Patient with Cancer. (Duke University Medical Center; Durham, North Carolina) Portland, OR: Bioject Corporation, undated document.

{Schuman1992} Schuman AJ. Preventing needlesticks and their consequences. *Contemp Pediatr* June 1992;9(6):76-106.

{Scott1996} Scott, Kelleigh. Robert Andrew Hingson, humanitarian [newspaper obituary]. *Atlanta: The Atlanta Journal and The Atlanta Constitution*, 13 October 1996, page G10.

{Seddon1981} Seddon SJ, Doran BRH. Alternative method of intercostal blockade.

Anaesthesia 1981;36:304-306.

{Seddon1984} Seddon SJ, Clayton KC. Intercostal nerve block by jet injection. *Anaesthesia* 1984 May;39(5):484-6.

{Semenkova1992} Semenkova GG, Sil'vestrov VP, Provotorov VM. Blizhaishie i otdalennye rezul'taty lecheniia bol'nykh nespetsificheskimi zabolevaniami legkikh s primeneniem mestnogo vvedeniia kontrikala i antibiotikov [The immediate and late results of treating patients with nonspecific lung diseases by using the local administration of kontrikal and antibiotics]. *Ter Arkh (Russia)* 1992;64(3):66-71 (UI: 93068850, PMID: 1279824).

{Servajan1872} Servajan J (Joannès). De l'aquapuncture dans certaines affections nerveuses (bulletin des hopitaux). *Bulletin Général de Therapeutique Médicale et Chirurgicale (Paris)* 1872;83:234-236. [Document accession no. «cote» 90014, La Bibliothèque Interuniversitaire de Médecine (BIUM), l'Université de Paris V - René Descartes]

{Servajan1876} Servajan J (Joannès). De l'aquapuncture. Thèse pour le doctorat en médecine de la Faculté de Medecine de Paris [Aquapuncture. Thesis for the doctorate in medicine of the Faculty of Medicine of Paris], presented and defended 8 March 1872, no. 99, pp. 1-48. [Document accession «cote» *Thèse Médecine Paris 1872 no. 99* (bac222/r0431), La Bibliothèque Interuniversitaire de Médecine (BIUM), l'Université de Paris V - René Descartes].

{Seyam1997} Seyam RM, Begin LR, Tu LM, Dion SB, Merlin SL, Brock GB. Evaluation of a no-needle penile injector: a preliminary study evaluating tissue penetration and its hemodynamic consequences in the rat. *Urology* 1997;50(6):994-998.

{Shakhtmeister1974} Shakhtmeister Iia, Gigauri VS, Ivanov LV, Shaporenko MV, Popova EB. Primenenie bezygol'nykh in"ektorov otechestvennogo proizvodstva v dermatologicheskoi praktike [Use of Soviet-made needleless injectors in dermatological practice]. *Vestn Dermatol Venerol* 1974;48(7):76-79.

{Shapiro1967} Shapiro SI. The Dermo-jet in dermatology. *Cutis* April 1967;3:382-384.

~R {Sherman1967} Sherman PM, Hendrickse RG, Montefiore D, Peradze T, Coker G. Simultaneous administration of live measles virus vaccine and smallpox vaccine. *Br Med J.* 1967 Jun 10;2(553):672-676.
[ARTICLE NOT YET CONFIRMED AS "NEEDLE-FREE"]

{Shen1981} Shen DT, Gorham JR, Ryland LM, Strating A. Using jet injection to vaccinate mink and ferrets against canine distemper, mink virus enteritis, and botulism, type C. *Vet Med Small Anim Clin* 1981 Jun;76(6):856-859.

{Smith1974} Smith KA, Stockman, JA. Letter: Jet injection anesthesia--a technique for painless bone marrow aspiration. *J Pediatr.* 1974;85(5):731-2.

{Souto2001} Souto FJ, Santo GA, Philippi JC, Pietro BR, Azevedo RB, Gaspar AM.

Prevalencia e fatores associados a marcadores do virus da hepatite B em população rural do Brasil central. [Prevalence of and factors associated with hepatitis B virus markers in a rural population of central Brazil]. Rev Panam Salud Pública. 2001 Dec;10(6):388-394.

<http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&list_uids=11820107&dopt=Abstract>

{Sowray1981} Sowray JH. Recent advances in jet injection. Int J Oral Surg 1981;10(Supplement 1):143-145.

{Spiegel1993} Spiegel A, Greindl Y, Lippeveld T, Decam C, Granga D, Nahor N, Bordonado J-L, Sperber G, Yankalbe M, Baudon D. Effet de deux stratégies de vaccination sur l'évolution de l'épidémie de méningite à méningocoque A survenue à N'Djamena (Tchad) en 1988 [Effect of two vaccination strategies on the evolution of the epidemic of meningococcal A meningitis which occurred in N'Djamena (Chad) in 1988]. Bull World Health Organization 1993;71:311-315.

{Spiegel1994a} Spiegel A, Lemardeley P, Germanetto P, Boutin JP, Desfontaine M, Lang J, Meyran M. Mini-Imojet® et vaccination anti-grippale dans les armées françaises. Tolérance immédiate et faisabilité. Actes: 4ème Séminaire International sur les Vaccinations en Afrique – « Bâtir des Partenariats Durables pour les Vaccinations en Afrique » [Proceedings: 4th International Seminar on Immunizations in Africa – “Building Durable Partnerships for Immunizations in Africa”], Yamoussoukro, Côte d'Ivoire, 13-16 March 1994. Association pour l'Aide à la Médecine Préventive. Eds: Parent du Châtelet I, Schlumberger M, da Silva A, Stoeckel P. Lyon: Fondation Mérieux Collection, 1994, p. 344-345.

[Frequency of blood appearing after influenza vaccination of 12,229 French troops in West Africa, using the Mini-Imojet® jet injector (PM3-C prototype) and manufacturer-prefilled Imule® vaccine cartridges. Thirteen of 53 separate vaccination sessions surveilled immediate blood (median frequency noted: 2% of injections); 8 sessions recorded requests for gauze: 4% median; 10 sessions reported blood within 30 seconds: 38% median; and 22 sessions noted any appearance of blood: 67% median.]

{Spiegel1994b} Spiegel A, Moren A, Varaine F, Baudon D, Rey M. Aspects épidémiologiques et contrôle des épidémies de méningite à méningocoque en Afrique [Epidemiological and control aspects of meningococcal meningitis epidemics in Africa]. Cahiers Santé May-Jun 1994;4(3):231-236.

{Spiess1964} Spiess H, Lüders D. Injektion ohne Nadel. Monatsschr Kinderheilk 1964;112:194-198.

{Spiess1968} Spiess H. Insulin durch Hypospray-Injektion [Insulin administration using hypospray injection]. Arch Kinderheilkd 1968;(Suppl 58):13-14.

{Spiess1975} Spiess H. Hepatitisübertragung durch Hochdruckinjektion? [Letter: Hepatitis transmission by high pressure injection?]. Dtsch Med Wochenschr 21 Nov 1975;;100(47):2465.

{Stamm1970} Stamm WP. Jet vaccination [letter]. Brit Med J 1970;4:303.

{Stanfield1966} Stanfield JP, Warley MA, Kintu S. 3. Experience with compressed comprehensive immunization schedules. In: Cook R, Jelliffe DB, eds., Recent Experience in Maternal and Child Health in East Africa. Journal of Tropical Pediatrics, December 1966;12(monograph 2, issued in conjunction with issue 3):9-13.

[mentions future Dermojet study in followup to results reported]

{Stanfield1971} Stanfield JP, Bracken PM. Measles vaccination: studies in methods and cost reduction in developing countries. Trans Royal Soc Trop Med Hyg 1971;65:620-628.

{Stanfield1972} Stanfield JP, Bracken PM, Waddell KM, Gall D. Diphtheria-tetanus-pertussis immunization by intradermal jet injection. Br Med J 1972;2(807):197-199.

{Stanfield1975} Stanfield JP, Bracken PM. Evaluation of methods designed to reduce cost of measles vaccine programmes. Trans R Soc Trop Med Hyg 1975;69(1):26-28.

~R {Steinbrocker1966} Steinbrocker O. [letter to the editor. Title:???] Arthritis and Rheumatism 1966;9:611-???

{Steinbrocker1973} Steinbrocker O. Cutaneous anesthetization with the Dermo-Jet. Arch Phys Med Rehabil Jun 1973;54(6):277.

{Stephens1964} Stephens RR, Kramer IRH. Intra-oral injections by high pressure jet. Brit Dental J 1964;117:465-481.

[Dental surgery, Dermojet]

{Stone19??} Stone JA. Biojector® Podiatry Position Paper. Fresno, CA: Jeffrey A Stone, DPM. Distributed by Bioject Corporation. Undated. (N3003, Revb. A)

{Sugibayashi2000} Sugibayashi K, Kagino M, Numajiri S, Inoue N, Kobayashi D, Kimura M, Yamaguchi M, Morimoto Y. Synergistic effects of iontophoresis and jet injector pretreatment on the in-vitro skin permeation of diclofenac and angiotensin II. J Pharm Pharmacol 2000;52(10):1179-1186.

{Suzuki1995} Suzuki T, Takahashi I, Takada G. Daily subcutaneous erythropoietin by jet injection in pediatric dialysis patients. Nephron 1995;69:347.

{Sweat2000} Sweat JM, Abdy M, Weniger BG, Harrington R, Coyle B, Abuknesha RA, Gibbs EP. Safety testing of needle free, jet injection devices to detect contamination with blood and other tissue fluids. Ann NY Acad Sci 2000;916(31):681-682.

[<http://www.annalsnyas.org/cgi/content/full/916/1/681?view=full&pmid=11193700>]

{Tabita1979} Tabita PV. Side effect of the jet injector for the production of local anesthesia. Anesthes Prog July-August 1979;102-104.

{Taunay1974} Taunay AE, Galvao PA, de Moraes JS, Gotschlich EC, Feldman RA. Disease

prevention by meningococcal serogroup C polysaccharide vaccine in preschool children: Results after eleven months in Sao Paulo, Brazil [abstract]. *Pediatr Res* 1974;8:429.

[Interim trial report: 67,000 children between 6 – 35 months of age received 50 µg serogroup C polysaccharide meningococcal vaccine by jet injection compared to equal numbers getting DT vaccine. No efficacy in 6-23 months, apparent protection 24-35 months.]

{Taylor1981} Taylor R, Home PD, Alberti KGMM. Plasma free insulin profiles after administration of insulin by jet and conventional syringe injection. *Diabetes Care* 1981;4:377-379.

{tenDam1970} ten Dam HG, Fillastre C, Conge G, Orssaud E, Gateff C, Tanaka A, Ortega Ramirez O, Wright J, Collas R, Chambon L, Barme M, Tommasi UB, Sarrat H, Brès P, Diallo L, Gauthier M, Piot M, Guld J. The use of jet-injectors in BCG vaccination. *Bull World Health Organ* 1970;43(5):707-720.

{tenDam1971} Ten Dam, HG, et al. Jet-injectors in BCG vaccination. *Clinical Pediatrics* 1971;10:4-5.

{Theintz1991} Theintz GE, Sizonenko PC. Risks of jet injection of insulin in children. *Eur J Pediatr* 1991, 150, 554-556

{Thomas1971} Thomas G. Mass immunization techniques [letter]. *Brit Med J* 14 August 1971;3(771):431.

[Porton Needle-less Injector (photograph)]

~R {Torres1997} Torres CAT, Iwasaki A, Barber BH, Robinson HL. Differential dependence on target site tissue for gene gun and intramuscular DNA immunizations. *J Immunol* 1997;158:4529-32.
[Helios™ gene gun]

{Towle1960} Towle RL. New horizon in mass inoculation. *Public Health Rep* June 1960;75(6):471-476.

*ID {Triau1967} Triau R, Joubert L, Valette L, Mynard MC. Controle toxicologique et pharmacologique du vaccin B.C.G. cryodesseche a usage intradermique. [Toxicological and pharmacological checking of freeze-dried B.C.G. vaccine for intradermal use]. *Rev Immunol Ther Antimicrob* 1967 Jan-Mar;31(1):61-74.

*ID {Tuft1932} Tuft L, Yagle EM, Rogers S. Comparative study of the antibody response after various methods of administration of mixed typhoid vaccine with particular reference to the intradermal and oral methods. *J Infect Dis* 1932;50:98-110.

{Uglovoi1975} Uglovoi GP, Korneeva SA, Bobylkova TV, Olsuf'ev NG. Vaksinatziia protiv tularemii bezygol'nym in "ektorom "Pchelka" [Vaccination against tularemia by means of the "Pchelka" jet injector]. *Zh Mikrobiol Epidemiol Immunobiol (Russia)*. Dec 1975;(12):122-3

(PMID: 1217342).

{Unanov1977} Unanov SS, Bochkov RA, Alekseeva AK, Kaptosova TI, Levchenko EN. Rezul'taty izucheniia zhivoi parotitnoi vaktsiny iz shtamma L-3 proizvodstva Moskovskogo nauchno-issledovatel'skogo instituta virusnykh preparatov. Epidemiologicheskaiia effektivnost' vaktsiny [Results of studying a live mumps vaccine from strain L-3 manufactured by the Moscow Research Institute of Viral Preparations. The epidemiological effectiveness of the vaccine]. Vopr Virusol (Russia) 1977;8(1):59-61 (UI: 78015532, PMID: 143795).

[Unanov1977 reported randomized, controlled studies of live mumps vaccine (L-3 strain) delivered as 0.1 mL dose subcutaneously in the deltoid area, among 51,701 vaccinated and 62,256 control subjects, using jet injection, with vaccine efficacy of 96.6%. No mention of jet injector device used, nor adverse reactions. Concluded needle-free method "more optimal" than needles.]

{USA1972} United States Department of the Army. Smallpox vaccination procedure [motion picture] / United States Army; produced by Walter Reed Army Institute of Research, Division of Medical Audio Visual Services. Publisher: [Washington]: The Army: [for loan by Armed Forces Institute of Pathology Audiovisual Support Center], 1972. Description: 1 reel, 23 min.: sd., col.; 16 mm.

{Vadhera1975} Vadhera KK, Bhardhwaj OP, and Sanyal MC. Trial of prototype Hypospray jet injector for T A B inoculation. Indian J Public Health April-June 1975;19(2):90-95.

~R-2003Aug22

{Vadoud-Seyedi2000} Vadoud-Seyedi J, Simonart T, Heenen M. Treatment of plantar hyperhidrosis with Dermojet injections of botulinum toxin [letter]. Dermatology 2000;201:179-179.

{Vahlsing1994} Vahlsing HL, Yankauckas MA, Sawdey M, Gromkowski SH, Manthorpe M. Immunization with plasmid DNA using a pneumatic gun. J Immunol Methods 1994;175:11-22. [Med-E-Jet@]

{Vallis1967} Vallis CP. Intralesional injection of keloids and hypertrophic scars with the Dermo-Jet. Plast Reconstr Surg Sep 1967;40(3):255-262.

{Vasil'eva1988} Vasil'eva RI, Merkur'eva LA, Iatsenko VG, Vasil'eva AM, Shvager MM. Kharakteristika klinicheskoi i immunologicheskoi bezvrednosti grippoznykh inaktivirovannykh vaktsin dlia detei v usloviakh mnogokratnoi immunizatsii [Characteristics of the clinical and immunologic safety of inactivated influenza vaccines in children undergoing multiple immunizations]. Zh Mikrobiol Epidemiol Immunobiol Nov 1988;(11):65-69 (UI: 89115692, PMID: 2975452).

{Vella1972} Vella EE. Cholera vaccination: Subcutaneous or intradermal administration? (letter). Lancet 1972; 1(7754):796-7.

{Vaughan1973} Vaughan JP, Menu JP, Lindquist KJ, Venneman A. A trial with a mixed

BCG smallpox vaccine given intradermally. *J Trop Med Hyg* 1973;76:262-???

{Verhagen1995} Verhagen A, Ebels JT, Dogterom AA, Jonkman JH. Pharmacokinetics and pharmacodynamics of a single dose of recombinant human growth hormone after subcutaneous administration by jet-injection: comparison with conventional needle-injection. *Eur J Clin Pharmacol* 1995;49:(1-2):69-72.

{Veronesi1966a} Veronesi R, Gomes LF, Soares MA, Correa A. Importancia do "jet-injector" (injeção sem agulha) em planos de imunização em massa no Brasil: resultados com as vacinas antitetânica e antivariolica [Importance of the jet injector (injection without a needle) in mass immunization projects in Brazil: results with anti-tetanus and anti-smallpox vaccines]. *Rev Hosp Clin Fac Med Sao Paulo* Mar-Apr 1966;21(2):92-95.
[Press-O-Jet]

{Veronesi1966b} Veronesi R, Correa A, Zuccas WA, Lopes OS. Tetanus immunization with a single dose of vaccine. Importance and possibilities for mass-immunization programs. Preliminary report on experimental studies. *Rev Inst Med Trop Sao Paulo* Mar-Apr 1966;8(2):83-88.

{Veronesi1967} Veronesi R, Penna HA, Issler H, Braga N de P, Carvalho PR de, Oria H, Monetti V. Sarampo e vacinação contra o sarampo no Brasil. Magnitude do problema e subsidios ao metodo das pequenas doses na imunização em massa. Avaliação clinico-sorológica de dois tipos de vacinas altamente atenuadas [Measles and measles vaccination in Brazil. Magnitude of the problem and contribution to the method of small doses in mass immunization. Clinico-serological evaluation of 2 types of highly attenuated vaccine]. *Hospital (Rio J) (Rio de Janeiro)* Oct 1967;72(4):1203-1232.

~R {Veronesi1970} Veronesi R; Correa A, Alterio D. Single dose immunization against tetanus. Promising results in human trials. *Rev Inst Med Trop Sao Paulo* Jan-Feb 1970;12(1):46-54.
[ARTICLE NOT YET CONFIRMED AS "NEEDLE-FREE"]

{Veronesi1975} Veronesi R, Brólio R, Netto CF, Franco do Amaral AD, Ferreira H, Sebe Filho E, Mazza CC, Oliveira CE, Zuccas WA. Intradermo diagnóstico simultâneo com antígenos inoculados a jato. Importância em inquéritos imuno-epidemiológicos [Simultaneous intradermal reactions of several dermojet-injected antigens. Their importance in immuno-epidemiological studies]. *Rev Hosp Clin Fac Med São Paulo* Jul-Aug 1975;30(4):357-361.

{Verrips1998} Verrips GH, Hirasing RA, Fekkes M, et al. Psychological responses to the needle-free Medi-Jector® or the multidose Disetronic® injection pen in human growth hormone therapy. *Acta Paediatr* 1998 Feb;87(2): 154-158.

{Vibes1971} Vibes J. Efficacité comparée de deux techniques de vaccination contre la grippe. Taux sérologique obtenus après administration du vaccine par le Porton Jet et la seringue [Comparative efficacy of two techniques of vaccination against influenza. Serologic rates obtained after administration of vaccine by the Porton Jet and by syringe]. *Médecine et Maladies*

Infecteuses 1971;1(3):343-348.

{Voelker1999} Voelker R. Eradication Efforts Need Needle-Free Delivery. JAMA May 26, 1999;281(20):1879-1881.

{Vorob'ev1972} A. A. Vorob'ev (Anatolii Andreevich), I. L. Nekrasov (Igor' L'vovich) [i], L. F. Bandakov (Leonid Fedorovich). Bezygol'nyi sposob vvedeniia biologicheskikh preparatov v organizm [Needle-free method for the introduction of biological preparations into organisms]. Moskva (Moscow): Meditsina ("Medicine", publisher), 1972, pp. 1-102. UI: 0356044, Language: Russian.

[Vorob'ev1972 is a detailed, thorough monograph on the history, physics, and performance of jet injectors, including foreign and Russian devices, photographs, equations, tables, graphs, and deposition x-rays and autopsies.]

{Voznyi1992} Voznyi EK, Meshcheriakova NG. Vnutriplevral'noe vvedenie platidiana (tsiplatina) v lechenii spetsificheskikh plevritov pri zlokachestvennykh novoobrazovaniyakh [The intrapleural administration of platidiam (cisplatin) in treating specific pleurisy in malignant neoplasms]. Vopr Onkol (Russia) 1992;38(10):1249-1253 (UI: 94127042, PMID: 1343153).

~R {Wallace1976} Wallace RB, Landrigan PJ, Smith EA, Pifer J, Teller B, Foster SO. Trial of a reduced dose of measles vaccine in Nigerian children. Bull World Health Organ 1976;53(4):361-364.

[ARTICLE NOT YET CONFIRMED AS RELEVANT TO "NEEDLE-FREE"]

{Warren1955} Warren J, Zihelr FA, Kish AW, Zihelr LA. Large-scale administration of vaccines by means of an automatic jet injection syringe. JAMA 1955;157(8):633-637.

{Weber1982} Weber HG; Willers H. Zur Optimierung der Roteln-Impfung. Serokonversion nach Roteln-Reihenimpfung mit dem Jet-Injektor [Improvement of rubella vaccination. Seroconversion after serial rubella vaccination with the jet injector]. Fortschr Med 1982;100:1161-1163.

{Wegmann1976} Wegmann A, Heiz R, Baumann T. Auffrisch-Impfung mit einem Diphtherie-Tetanus-Impfstoff für Dermo-Jet mit niedrigem Diphtherietoxoidgehalt [Booster vaccination with a diphtheria-tetanus vaccine for Dermo-Jet with low diphtheria toxoid content]. Schweiz Med Wochenschr (Switzerland) 24 Jan 1976;106(4):112-114.

{Weintraub1998} Weintraub AM, Ponce de Leon M. Potential for cross-contamination from use of a needleless injector. AJIC Am J Infect Control 1998;26:442-445.

{Weller1966} Weller C, Linder M. Jet injection of insulin vs. the syringe-and-needle method. JAMA 1966;195:156-159.

[includes radiograph of injection deposit by Hypospray®]

~R {Welty1970} Welty TK, Josimovich JB, Gerende JH, Hingson RA. Reduction of variability in the anovulatory period following medroxyprogesterone acetate

injection by using jet injectors. *Fertility and Sterility* 1970;21(9):673-682.

{Wenger1990} Wenger JD, Spika JS, Smithwick RW, Pryor V, Dodson DW, Carden GA, Klontz KC. Outbreak of *mycobacterium chelonae* infection associated with use of jet injectors. *JAMA* 1990;264(3):373-376.

{Werner1974} Werner HP, Ambrosch F, Wiedermann G, Meschkat A. Bakteriologische Untersuchungen bei Reihenimpfungen mit dem Hypospray- jet-Injector [Bacterial investigations in serial inoculations with the Hypospray jet injector (author's transl)]. *Zentralbl Bakteriol [I. Abt. Orig. B]* Apr 1974;158(6):593-597.

{White1969} White WG. Porton Jet injector. *British Medical Journal* 2 Aug 1969;3:472-473. [radiograph of injection with Hypaque™ contrast medium]

{Whittle1987} Whittle HC, Lamb WH, Ryder RW. Trial of intradermal hepatitis B vaccines in Gambian children. *Ann Trop Paediatr* 1987;7:6-9. [Imo-Jet (Mérieux)]

{WHO1980} World Health Organization, Expanded Programme on Immunization. Summary report on jet injector testing in the laboratory and in the field. Geneva: World Health Organization, document WHO/EPI/CCIS/80.14, 1980;1-10. [Report on comparative bench testing and field observation in mass campaign use in Ghana of (1) Ped-O-Jet, (2) Hyjettor, (3) Med-E-Jet, (4) Hypospray. Cites Linder1979 and Hanson1979]

{WHO1986} World Health Organization, Expanded Programme on Immunization. Transmission of hepatitis B associated with jet gun injection. *Weekly Epidemiological Record* 1986;61:309-311.

{WHO1987} World Health Organization, Global Advisory Group. Expanded Programme on Immunization. *Weekly Epidemiological Record* 16 January 1987;62:5-9. [Following California hepatitis B outbreak (CDC1986, WHO1986, Canter1990), suggests restrictions on use of jet injectors until risk of disease transmission can be clarified.]

{WHO1988} World Health Organization, Expanded Programme on Immunization. Viral hepatitis. *Weekly Epidemiological Record* 1988;63:89-91.

~R 2002Aug06 {WHO1992} World Health Organization. Knocking the spots off measles. *Technet News - Logistics for Health*. Geneva: World Health Organization, Global Programme on Vaccines and Immunization, 1992;92(2):7.

{WHO1993} World Health Organization. Jet guns on trial. *Technet News - Logistics for Health*. Geneva: World Health Organization, Global Programme on Vaccines and Immunization, 1993;93(2):4.

{WHO1994} World Health Organization. Safety of injections in immunization services: WHO recommended policy. Geneva: World Health Organization, Global Programme on Vaccines and Immunizations, August 1994, document WHO/EPI/LHIS/94.1 (3 cover/preface pages, 5 text pages).

{WHO/WPRO1995} World Health Organization/Western Pacific Regional Office. Protocol for field trials of low-workload jet injectors. Draft document, dated November 1995 (2 pages cover and contents, 6 pages text, 12 pages annexes).

{WHO1996} World Health Organization. Technet subcommittee meeting on the safety of injections, Geneva, 29 October - 1 November 1996. Geneva: World Health Organization, Global Programme on Vaccines and Immunizations, document, 1996;1-27.

{WHO1996} World Health Organization. Safety of injections in immunization programmes: WHO recommended policy. Geneva: World Health Organization, Global Programme on Vaccines and Immunizations, document WHO/EPI/LHIS/96.05, 1996;1-11.

{WHO1997a} World Health Organization. Steering group on the development of jet injection, Geneva, 18-19 March 1997. Geneva: World Health Organization, Global Programme on Vaccines and Immunizations, document, 1997;1-37.

{WHO1997b} World Health Organization. Safety of injections: WHO-UNICEF policy statement for mass immunization campaigns. Geneva: World Health Organization, Global Programme on Vaccines and Immunizations, document WHO/EPI/LHIS/97.04, 1997;1-4

{WHO1997c} World Health Organization. Safety of injections: WHO-UNICEF policy statement for mass immunization campaigns. Geneva: World Health Organization, Global Programme on Vaccines and Immunizations, document WHO/EPI/LHIS/97.04 Rev. 1, 1997;1-4

{WHO1998} World Health Organization. Use of needle-free injectors for immunization [Note for the record 25 March 1998]. Geneva: World Health Organization, Expanded Programme on Immunization, Quality and Injections Safety Cluster, 1998;:1.

{WHO1999} World Health Organization (Lloyd J). Technologies for vaccine delivery in the 21st century: A white paper of WHO, UNICEF, USAID and PATH. (Technet Consultation, Harare, Zimbabwe, 6-10 December 1999). Geneva: World Health Organization, Vaccines and Biologicals (Document WHO/ATT/TECHNET.99/Opening Session/WP.1).

http://www.who.int/vaccines-access/Restructuring/99_PDF_Files/whitepap.pdf

{Wijsmuller1975} Wijsmuller G, Snider DE. Skin testing: A comparison of the jet injector with the mantoux method. *Am Rev Respir Dis* 1975;112:789-798.

{Williams1991} Williams RS, Johnston RA, Riedy M, DeVit MJ, McElligot SG, Sanford JC. Introduction of foreign genes into tissues of living mice by DNA coated microprojectiles. *Proc Natl Acad Sci USA* 1991;88:2726-30.

[Helios™ “gene gun” precursor]

{Williams1996} Williams J, Fox-Leyva L, Wainright K, Snowball M, Negus S, Christensen C, Tanttila H, Koller R, McMahon B, Getty M, Peters H, Stout R, Krause D. Evaluations of two injection systems: jet injection (Biojector) vs. needle and syringe with the hepatitis A vaccine (Havrix). Tenth International Congress on Circumpolar Health, Anchorage, Alaska, 19-24 May 1996 [poster abstract].

{Williams2000} Williams J; Fox-Leyva L; Christensen C; Fisher D; Schlicting E; Snowball M; Negus S; Mayers J; Koller R; Stout R. Hepatitis A vaccine administration: comparison between jet-injector and needle injection. *Vaccine* Mar 17 2000;18(18):1939-1943.

{Wilson1973} Wilson HD. Experience of BCG vaccination by jet injection in an outbreak of primary tuberculosis. *Lancet* April, 28 1973;1(7809):927-8.

~R 2003Aug06 {Wilson2001} Wilson CL. No-needle anesthesia. Program and abstracts from the American Academy of Family Physicians 2001 Scientific Assembly, 3-7 October 2001, Atlanta, Georgia (session 266). Leawood, Kansas, USA: American Academy of Family Physicians.
[MadaJet, see Davis2001 review]

{Winter1975} Winter CC, Khanna R. Peyronie's disease : results with Dermo-Jet injection of dexamethasone. *Journal of Urology* Dec 1975;114(6):898-900.

{Wolff1971} Wolff L. Jet spray in nasal surgery. *Arch Otolaryngol* 1971;93(3):327-9.

{Wood1980} Wood PB, Shoeranda KS, Bracken PM, Houser NE. Measles vaccination in Zaire--when and how? *Trans R Soc Trop Med Hyg* 1980;74(3):381-2.

{Woringer1964} Woringer F. Étude histologique de l'injection cutanée par «Dermo-Jet» [Histologic study of cutaneous injection with the "Dermo-jet"]. *Bull. de la Société Française de Dermatologie et Syph.* 1964;71(3):371-372.

{Worth1980} Worth R, Anderson J, Taylor R, Alberti KGMM. Jet injection of insulin. A comparison with conventional injection by syringe and needle. *Br Med J* 1980;281:713-714.

{Wright1968} Wright M. Influenza vaccine programme using the hypospray jet injector method. *Occupational Health (London)* 1968;20(5):254-257.

{Zachoval1988} Zachoval, R., Deinhardt, F., Gurtler, L., Eisenburg, J., and Korger, G. Risk of virus transmission by jet injection. *Lancet.* 23 January 1988:189.

{Zaffran1997} Zaffran M, Lloyd J, Clements J, Stilwell B. A drive to safer injections. Geneva: World Health Organization, Global Programme on Vaccines and Immunization, document GPV/SAGE.97/WP.05, 1997;1-24.

{Ziff1956} Ziff M, Contreras V, Schmid FR. Use of the Hypospray jet injector for the intra-

articular and local administration of hydrocortisone acetate. *Ann Rheum Dis* 1956;15:227-232.

~R {Zimmon1987} Zimmon DS. Injection pistol for volume control of contrast injection during endoscopic retrograde cholangiopancreatography. *Gastrointest Endosc* June 1987;33(3):238-40.

{Zsigmond1995} Zsigmond EK, Kovacs V, Fekete G. A new route, jet injection for anesthetic induction in children: I. midazolam dose-range finding studies. *Int J Clin Pharmacol Ther* 1995;33:580-584.

{Zsigmond1996} Zsigmond EK, Kovacs V, Fekete G. A new route, jet injection for anesthetic induction in children - II. Ketamine dose-range finding studies. *Int J Clin Pharmacol Ther* 1996;34:84-88.

{Zsigmond1999a} Zsigmond EK, Darby P, Koenig HM, Goll E. V. A new route, jet injection of lidocaine for skin wheal for painless intravenous catheterization. *International Journal of Clinical Pharmacology and Therapeutics* 1999;37:90-99.
[Med-E-Jet, Biojector]

{Zsigmond1999b} Zsigmond EK, Darby P, Koenig HM, Goll EF. Painless intravenous catheterization by intradermal jet injection of lidocaine: A randomized trial. *J Clin Anesth* 1999; 11(2): 87-94.

{Zvozchik1973} Zvozchik VG, Segal LS, Bogdan VL. Bezygol'naia tuberkulinizatsiia krupnogo rogatogo skota [Needleless tuberculinization of cattle]. *Veterinariia* 1973 Jul;7:44-6. [Russian]

UNLOCATED CITATIONS FROM DERMO-JET WEB BIBLIOGRAPHY

Marvin Ackerman. *Dermatology Digest*. Intralesional jet injection : Some personal observations [NOT IN MEDLINE]

M. Bergouignan & M. Berthon. *Annales Medico-Psychiatrique*. Notre expérience de la méthode et de l'appareil du Dr Krantz (Dermo-Jet) [NOT IN MEDLINE]

C. Bertenyi, I. Schneider. [Traitement sclerosant de varicosités par voie percutanée et à l'aide d'un pistolet pour vaccination (Dermo-Jet)]. [In Hungarian? French?] Kreussler - Clinique Dermatologique de Sveged, Hongrie (Hungary). YEAR?? VOL? PAGES???? [NOT IN MEDLINE]

F. Cantrelle Notes sur le fonctionnement du Dermo-Jet du Dr. Krantz. ORST Outre Mer YEAR??? VOL??? PAGES??? [measles] [NOT IN MEDLINE]

Victor G. Dewolfe. Cleveland Clinic. Utilisation du Vaccijet pour la vaccination contre la Rougeole et variole [NOT IN MEDLINE]

- J.P Gagnard et G. P.E. Transfusion T.V. No. 3-4. Anesthesie locale et prise de sang
[NOT IN MEDLINE]
- MJ Guez. Journal de Médecine de Bordeaux. Les infiltrations novacainiques : traitement radical d'un syndrome très fréquent [NOT IN MEDLINE]
- Y. Hara. Revue Chinoise de Dermatologie. Intralesional therapy of triamcinolose Diacetate in Psoriasis and other Dermatoses [NOT IN MEDLINE]
- A. J. Held. Rapport concernant le Dermo-Jet du Dr. Krantz. Institut de Medecine Dentaire SOURCE??? YEAR?? VOL?? PAGES?? [NOT IN MEDLINE]
- Dr Kartmann. Cinesiologie, No. 2. Traitement d'urgence des entorses simples [NOT IN MEDLINE]
- Dr A. Krantz. Bulletin de la société medicale de Pau. Effets spectaculaires de la "Jet-Puncture" dans les douleurs fonctionnelles [NOT IN MEDLINE]
- E.G Lapinet. International conseils Cosmeto-Biodynamiques. Injecter un liquide dans les rides du visage avec le Dermo-Jet [NOT IN MEDLINE]
- Malaplate M. [TITLE??? - about BCG and Dermo-Jet, France] [SOURCE???] [NOT IN MEDLINE]
- R. Martin du Pan. Le Dermo-Jet peut-t'il rendre des services en Médecine Militaire? Journal trimestriel des Officiers Suisses du service de Santé [NOT IN MEDLINE]
- R. Martin du Pan. La vaccination contre la variole par le Dermo-Jet. IVème congrés International pour les maladies infectieuses. YEAR??? CITY??? ABSTRACT??? SPONSOR??? [NOT IN MEDLINE]
- Ch. Merieux, J. Liautaud, R. Plan, R. Triau. VIème congrés national de transfusion sanguine, Préparation d'une gammaglobuline humaine spécifique du tétanos [NOT IN MEDLINE]
- Luis M. Mirande, Jorge A. Valera & Carlos A.Perroni. Nuestra experiencia con el Dermo-Jet del Dr Krantz Archives Argentines de Dermatologie. [NOT IN MEDLINE]
- Dr Schweiz. Serum & Impfinstitut Bern. Vaccination BCG [NOT IN MEDLINE]
- F. Vasquez & C. Quevedo. Clinica La Alinaza, Barcelone. Technique originale du traitement sclérosant des hémorroïdes [NOT IN MEDLINE]

G.N. Wachs & T. A. Tromovitch. Cutis/Original Article. Treatment of Alopecia Areata with the Dermo-Jet [NOT IN MEDLINE]

M. Wolinger. Compte rendu (de ???). Notre experience avec le Dermo-Jet du Dr Krantz [NOT IN MEDLINE]

Xnguyen Dinh Huong. Tiem Phong Lao Bang PhuOng Phap Dermo Jet. **TITLE???**
YEAR??? **VOL???** **PAGES???** [NOT IN MEDLINE]

RELATED-SUBJECT ARTICLES NOT SPECIFICALLY "NEEDLE-FREE"

Chippaux JP, Soula G, Campagne G, Rey M, et al. Optimiser la riposte aux épidémies de méningite à méningocoque: rapport d'un atelier d'experts réunis au CERMES (12 au 14 janvier 1998, Niamey, Niger). Atelier de Niamey [Optimizing the response to epidemics of meningococcal meningitis: report of a workshop of experts at CERMES (Niamey, Niger, 12th to 14th January 1998)]. Cahiers Santé May-Jun 1998;8(3):245-248.

MANUFACTURER ROSTER (past & current, listed by device tradename)

Accell® (see **Helios™**)

Advantajet™, Freedom Jet™, GentleJet™, (also see **PreciJet™, Preci-Jet 50®**)

See: Bareille1997

<http://www.advantajet.com/index.html>

Activa Brand Products, 6845 Davand Drive, Mississauga, Ontario L5T 1L4 Canada, Tel: 902-566-3229, Fax Numbers - 902-629-1404 or 905-565-0065

USA distributor: Carousel Medical Systems, Inc. (<http://www.carouselmed.com>), 7343 Surf Drive, Kempton, PA 19529, Tel: +1 866-640-6890, Fax: +1 703-935-7530.

[Former manufacturer: Health-Mor Personal Care Corp. 185 East North Street, Bradley, Illinois 60915, 815-932-5570, fax 815-932-4101, bought by Canadian company in 1998.]

Agro-Jet® (see **Med-Jet™**)

Am-O-Jet™

American Jet Injector, Inc., 880 Orchard Lane, Lansdale, PA 19446-4520,

Tel: (215) 362-4815, Fax: (215) 362-4819, pager: 800-609-7231

Orifice: .005 inch = 0.127mm

Same out-of-patent design as Ped-O-Jet®

Avijet (see **Syrijet Mark IV**)

See: Eidson1976

Mizzy, Inc., New York, NY

Berijet

Behring, Frankfurt Germany
 See: Zachoval1988

BI-100™, BI-3M™, BI-1M™, BI-2, BI-3, BIP-4, BI-19

see Agafonov-multiple years, Vorob'ev1972 (photos), Evstigneev1994, Lukin1997, Chemical Automatics Design Bureau (KB Khimavomatiki), Voronezh, Russia Scientific & Research Institute of Surgical Instruments and Equipment (engineers L.F. Banacov and S.P. Vanjushin)

- <http://www.inspacemedia.com/english/info/industrylinks/2001/006.shtml>
- <http://www.istc.ru/istc/db/inst.nsf/wu/1141>
- <http://www.russianspace.com/voronezh.html>
- <http://www.fas.org/spp/civil/russia/kbkha.htm>
- http://www.path.org/technos/ht_measles_elim_inject.htm
- <http://www.path.org/files/htup-JetInjector.pdf>
- <http://www.feltonint.com/>
- <http://cisa1.lanl.gov/Forms/Alan.pdf>

Biojector™ 2000

See: Monroe1992, Jackson1993, Davis1994, Gerbert1996, Williams1996, Gardner1997, Greenberg1994, Greenberg1995, Zsigmond1995, Zsigmond1996, Gerbert1996, Florentine1997, Anonymous1997, Bennett1998, Phero1998, Cartier2000, Williams2000, Boyer??YEAR??, Stone??YEAR??, Schultz??YEAR??,

<http://www.bioject.com/>

Bioject Inc., 7620 SW Bridgeport Road, Portland, OR 97224)

<u>BIOJECTOR ORIFICES:</u>	<u>inches</u>	<u>mm</u>	<u>Indication</u>
cartridge #2 (green 1502100) =	0.0039 inch	0.10 mm	SC
cartridge #3 (brown 1503100) =	0.0059 inch	0.15 mm	IM thigh - infants 15-20" height, 0-15 lbs. weight; IM deltoid - 21-47"/16-50 lbs
cartridge #4 (blue 1504100) =	0.0078 inch	0.20 mm	IM thigh/gluteus 21-47"/16-75 lbs. IM deltoid children >50 lbs, small adults (<80% median lean weight for height)
cartridge #5 (silver 1505100) =	0.0098 inch	0.25 mm	IM deltoid average adults (80-120% median lean weight for height)
cartridge #7 (red 1507100) =	0.0142 inch	0.36 mm	IM deltoid large adults (>120% median lean weight)

for height)

Biostar

Biostar, Inc., 343-111 Research Drive, Saskatoon, Saskatchewan S7N 3R2, Canada,
Tel: [1](306) 931-7500, Fax: [1](306) 242-9010,
email: jmanns@innovplace.saskatoon.sk.ca

DCI, Inc.

See **LectraJet™**

Dentjector®

Robbins Instruments Company, Chatham, NJ 07928
See advertisement and photograph on page 97 after Greenfield1972 article.

Derata Medi-Jector V

see **Medi-Jector** (below)

Depuy, Inc., 700 Orthopaedic Drive, Warsaw, IN 46581-0988,
Fax: 219-267-7196, Sales: 219-267-8143, 800-366-8143

Dermo-Jet™ [Dermojet], VACCI-JET (various models)

See: Krantz1959, Juel-Jensen1965, Rey1965a, Calvert1966, Cooper1966,
Lane1966, Martin-du-Pan1966, Jeanneret1967, Rey1967, Krantz1970,
tenDam1970, Griffiths1971, Bakhur1972, Rey1972, Steinbrocker1973,
Bonner1973, Lachapelle1977, FernándezdeCorres1982,
Lachapelle1982a, Lachapelle1982b, Kok1983, Lachapelle1985,
Dimache1986, Mihailescu1989, Dimache1991a, Dimache1991b,
Brodell1995, Furth1995, Dimache1997

Société AKRA, 23 bis rue Louis Barthou, Pau, FRANCE 64000, Tel: [+33] 59 274746,
Fax: [+33] 59 272270, <http://www.chez.com/dermojet/>,
dermojet@club_internet.fr

Previous U.S. distributor: Louis A. Awamy, 113 Sheraden Avenue, Staten Island, New
York 10314.

(Orifice = 0.2mm = 200um)

Dermojet S-591-H

no. 106078 B1 OSIM Romania

Manufactured by Aerotech S.A., Hydraulic and Pneumatic Equipments, Bucharest,
Romania (see Dimache1997).

Ormont Drug and Chemical (see Shen1981)

EMS/MPM

See: Cartier2000, Ren2002

EMS Medical GmbH

Obere Laube 44

Konstanz, D-78462 Germany

EMS/RPM

See: Cartier2000

EMS Electro Medical Systems

Ch. de la Vuarpillière 31, CH-1260 Nyon, Switzerland

Phone +41 22 99 44 700, Fax +41 22 99 44 701, E-mail: welcome@ems-ch.com

<http://www.ems-medical.com>, <http://www.ems-dent.com>

Felton Medical, Inc. and Felton Medical International (See BI-100™, et al.)

11535 West 83rd Terrace, Lenexa, Kansas (KS) 66214

Tel: [+1] (913) 599-5959, Fax: [+1] (913) 599-0909, felton@wws.com

<http://www.feltonint.com/>

<http://www.feltonmedical.com/>

Genesis Medical Systems, Inc. (See Sensa-Jet)

Genotropin® ZipTip™ (See ZipTip™, below)

GunA

See: Cartier2000

Max Planck Institute of Biophysical Chemistry, Göttingen, Germany

“Designed and constructed by P.A.F.”

Helios™ “gene gun”

(related **Accell®** [Agracetus, Madison WI] and **Biolistic® PDS 1000/He** bombardment systems)

See: Williams1991, Fynan1993, Pertmer1995, Haynes1996, Feltquate1997, Ren2002

Bio-Rad, Inc., http://www.bio_rad.com, Life Science Research Group, 2000 Alfred Nobel Drive, Hercules, CA 94547, Tel: (510) 741-1000, toll free 1-(800) 424 6723, Fax: (510) 741-5800, toll free fax: 1-(800) 879 2289, telex: 335-358.

Hypospray®

See: Figue1948, Hingson1947, Hughes1949a (photo), Perkin1950 (photo), Ziff1956, Barrett1962, Cockburn1965, Cunningham1965, Garbsch1966, Baum1967, Morse1967, Spiess1968, Wright1968, Hughes1969a (photo), Hughes1969b (photo), Helm1969, Neumann1973, Werner1974, Vadhera1975, Clarke1975

R.P Scherer Corp, Detroit, MI circa 1940s-1950s

“Metapule” orifice = 0.003 - 0.005 inch = 0.076 - 0.127 mm (75-80um = 0.003)

Hyjettor

See: WHO1980

Tokyo Sokuhan Co., Ltd. (now Nidec Tosok Corporation), Japan

http://www.tosok.co.jp/gaiyo/e_gaiyo.html

Iject™ (see Biojector 2000)

Imo-Jet™, Im-O-Jet™, I.M.-O-JET™ (Also see **Mini-Imojet®**)

See: Greenwood1980, Whittle1987, Rey1989, Galy1992

multiple-use-nozzle jet injector device

Institut Mérieux, Lyon, France;

Injet-100

Injet Medical Products, Inc., 22500 Muirlands Boulevard, Lake Forest, CA 92630

INJEX™

See: Sarno2000

Equidyne Systems, Inc., 11696 Sorrento Valley Rd., Suite J, San Diego, CA 92121,

Phone 619-350-8096, Fax: 619-350-9726, equidyne@equidyne.com,

<http://www.equidyne.com/>, <http://www.pharma.it/eng/injex.htm>

Intraject™

~~Weston Medical, Ltd. New Street, Stradbroke, Eye, Suffolk, England IP21 5JG, UK,~~

~~Tel: [+44] (1379) 383 900, Fax: [+44] (1379) 384 800 .[http://www.weston-](http://www.weston-medical.com)~~

~~[medical.com](http://www.weston-medical.com)~~

Acquired by Aradigm Corporation, <http://www.aradigm.com/tech/intraject.html>

Isajet™ (see **Mesoflash®**)

Ject-Aid [?? NOT YET CONFIRMED AS “NEEDLE-FREE” ??]

Past addresses:

Autoject Systems, Inc., Oakwood Centre, 620 Wheat Lane, Oakdale, IL 60191

USA ???

Injectec, Inc., 11278 Los Alamitos Blvd, Suite 202, Los Alamitos, CA 90720

USA ???

J-Tip®, J-Tip® Injector System

US Patent no. 4,913,699

National Medical Products (Tim Chapman), 57 Parker Street, Irvine, CA 92618

Tel: [+1] (949) 768-1147, Fax: [+1] (949) 768-1167, info@jtip.com

<http://www.jtip.com>

(Formerly: California Medical Innovations, Inc., 24121 Big Timber Street, Lake Forest, CA 92630)

0.5 mL device: orifice size 0.008 inch (0.2 mm)

0.25 mL device: orifice size 0.006 inch (0.15 mm)

LectraJet™ (tentative, *inter alia*)

See: Carter2003

D'Antonio Consultants International (DCI), Inc.

6308 Fly Road, E. Syracuse, NY 13057

Tel:(315)463-4999 Fax: (315)463-5267 Email: rdc11@twcny.rr.com

<http://www.dantonioconsultants.com>

US patents 5080648, 5318522, and US5569190

MadaJet™, MadaJet XL™

See: Field1985, Lamm1985, Davis2001, Wilson2001

MADA Medical Products, Inc.

http://www.madainternational.com/us/menu_us.html

US:

MADA Equipment Co., Inc.

60 Commerce Road, Carlstadt, NJ 07072, USA

Tel: 1-201-460-0454, Fax: 1-201-460-3509, Toll Free: 1-800-526-6370

110522.1404@compuserve.com

International:

MADA International, Ltd.

11430 N. Kendall Drive Suite 312, Miami, FL 33176, USA

Tel: 1-305-274-2184, Fax: 1-305-274-2692, info@madainternational.com

Med-Jet™, Agro-Jet® (<http://www.wltdistributors.com/needle.html>)

Medical International Technologies (M.I.T.) Inc.

2281 Guenette, Ville Saint-Laurent

Montréal, Québec H4R 2E9 Canada

Tel : 514-339-9355, Fax : 514-339-2885, kmenassa@mitcanada.ca

Med-E-Jet™ (Pow'r-Ject™ - veterinary application)

See: Neufeld1977, Glosemeyer1979, Cooke1980, Seddon1981, McKenzie1978, Cohn1972, Cohn1974, Canter1990, Vahlsing1994

Latest: "Med-E-Jet Inoculator", Evans Enterprise, 1293 Sunset Road, Mayfield

Heights, Ohio 44124 USA, tel: (440) 473-1110, fax: (440) 473-1150,

Evans@star21.com, http://www.clevenet.com/med_e_jet/

Earlier owner: Med-E-Jet Corporation, 12900 Trisket Road, Cleveland, Ohio 44115

Earlier owner: 8092 Olmway Avenue, Olmsted Falls, Ohio 44138, Tel: 1-800-231-4203.

(DSCP/DOD 28-May-98: "...Mr. Don Kuch now owns the parts and plans for their unit.")

orifice size: 0.15mm (Seddon1981)

MEDiVAX™

Program for Appropriate Technology in Health (Vitajet Corp.)

4 Nickerson Street, Seattle, Washington

orifice = 0.006 inch

<http://www.path.org>

Medi-Jector EZ®, Medi-Jector Choice®

See: Neufeld1977, Martins1979, Houtzagers1988, Denne1992, Partsch1997, Gonzalez1997

Antares Pharma (<http://www.antarespharma.com/>)

[Formerly: Medi-Ject Corporation <http://www.mediject.com/>]

[Formerly: Daystrol-Scientific, Inc. Minneapolis, MN 55435]

[Formerly: Derata Corporation (see Pehling)]

Former address: 161 Cheshire Lane, Suite 100, Minneapolis, MN 55441 USA (800) 328-3074 or (612) 475-7700. Fax: (612) 476-1009

Latest address: 161 Cheshire Lane, Suite 100, Minneapolis MN 55441 USA, tel 612-475-7705, fax 612-476-1009

Mesoflash®, **Isajet™**

See: Lachapelle1985, Haensler1999

rue Gustave Gresse, 26400 Aouste sur Sye, France

Tél (04) 75 76 60 53, Fax (04) 75 76 60 54, pprolitec@compuserve.com

(**Mesoflash®** models M10 and M40, **Isajet™** models Isa10 [mice], **Isa40** [humans])

Formerly: Béarn Mécanique Aviation S.A. (Boite Postale 41, Lons, F-64143 Billère, Cedex France)

Mini-Imojet® (using **Imule®** cartridge) (also see **Imo-Jet**)

See: Galy1992, Spiegel1994a, Fisch1996, Parent du Châtelet1997, Schlumberger1999

Pasteur-Mérieux Sérums et Vaccins (Pasteur Merieux Connaught, Rhône Poulenc, later Aventis Pasteur): Dr. Jean Lang: lang@bdr.pasteur-merieux.fr, 58 avenue Leclerc - B.P. 7046, 69348 LYON, Cedex 07 FRANCE, Tel: (33) 7273 7036, Fax: (33) 72 73 78 13

Mini-Ject™

Biovalve, Technologies, Inc., 1 Innovation Drive, Worcester, MA 01605, USA.

bgonelli@biovalve.net.

<http://www.mpmcapital.com/Flash/portfolio/biovalve.html>

<http://www.biovalve.com>

Pan-Jet, **PanJet**, **Panjet-70**, **Panjet Mark 5** (“**Intrajet**”)

See: British Thoracic and Tuberculosis Association 1971, Stanfield1972, Paul1978, Lambrianidis1979, Sowray1981, Berry1981, Whittle1987

SHUCO International, Ltd., London, UK

Former U.S. distributor: Panray Division, Ormont Drug and Chemical Co., South Dean Street, Englewood, New Jersey 07631.

Ped-O-Jet®

See: Gateff1960s/1970s, Meyer1964, Meyer1965, Hendrickse1966a, Hendrickse1966b, Artus1966, Bettag1967, Budd1967, Morse1967, Rey1967, Gateff1968, Dull1968, Millar1969a, Millar1969b, Neff1969, Chambon1970a/b/c, Gateff1970, Labusquiere1971, Millar1971, Gotschlich1972a, Gotschlich1972b, Rey1972, Carnus1973, Rey1973, Rubin1973, AmatoNeto1974, Carnus1974, Neufeld1977, Mohammed1981, Pluciennik1985, Fenner1988, Ped-O-Jet-International1991, Furth1992, Furth1995a, Furth1995b, Jenkins1995, Carter2003, *inter alia*

U.S. patent no. 3,301,190

Manufacturer/distributed by Ped-O-Jet International - Keystone Industries, 616
Hollywood Avenue, Cherry Hill, NJ 08002, Tel: 609-663-4700, Fax: 609-663-
0381, nkeystone@aol.com

Previous manufacturers:

- (1) Stirn Industries, Dayton NJ (US production, French ownership)
- (2) Vernitron Medical Products, Inc., Carlstadt, NJ;
- (3) Scientific Equipment Manufacturing Corporation (SEMCO), Lodi, New Jersey; and
also Larchmont, New York (previous name "Hypodermic jet injection apparatus,
automatic")

Subcutaneous nozzle orifice diameter: .005 inch = 0.127mm

Intradermal nozzle orifice diameter: ???

PenJet™

(US patents 5,730,723 & 5,851,198)

Visionary Medical Products Corporation; Penjet™

Box 6911, Beverly Hills, CA 90212, Tel: 310-201-0800, info@vmvc.com

<http://www.vmpc.com/>

Porton Jet, Port-O-Jet, Porton Needle-less Injector

See: White1969, Thomas1971, Vibes1971

Powderject™

See: Dégano1998, Duckworth1998,

PowderJect Vaccines, Inc.

585 Science Drive, Madison WI 53711

Tel 608-231-3150, Fax 608-231-6990, <http://www.powderject.com/>

russ_smestad@powderject.com, lendon_payne@powderject.com

(Formerly: Geniva/Oxford Bio Sciences Ltd.)

(?Corporate links with BIO-RAD/Auragen DNA gold beads jet guns: **Helios™**,

Biolistic® PDS 1000, and **Accell®**)

Pow'r-Ject™ (see Med-E-Jet™)

Preci-Jet 50®

Identical to **AdvantaJet®** etc. (see above)

See: Theintz1990, Bareille1997, Denne1992

Advanced Medical Technologies, Charlottetown, Prince Edward Island, C1E 1B0 Canada

Press-O-Jet

See: Warren1955, Hingson1957 [diagram], Hingson1963, Veronesi1966a

developed by Zihlerl, Kish, and Warren (Z. & W. Manufacturing Co.)

orifice = 0.003 - 0.005 inch = 0.076 - 0.127 mm

1 mL steel reusable chamber

Distributor: Robbins Instruments, Inc., 2 North Passaic Ave. - Box 441, Chatham, NJ

07928, Tel: (201)635-8972, Fax: (201)635-8732

Sensa-Jet™

Genesis Medical Technologies, Inc.

Robert E. Jones, President/Director, Suite 400B, 1600 Downing Street, Denver, CO
80218, Tel: 303-832-4909, Fax: 303-832-4919, cell 303-472-2997,
genmed@idt.net

Press release: <http://www.prnewswire.com/cgi-bin/stories.pl?ACCT=104&STORY=/www/story/12-22-1998/0000831767&EDATE=>

SICIM

SICIM s.p.a., Via Aquileia, 94, 34076 Romans d'Isonzo (GO) Italy,
Tel: 39 481 90188/ 39-481 90332, Fax: 39 481 90332)

SNAP JET®

Cambridge Biostability, Ltd.. Sumpter House, 8 Station Road, Histon, Cambridge CB4
4LQ United Kingdom
Fax: [+44] (1223) 352-960

Syrijet, Syrijet Mark IV (see Avijet)

See: Bennett1971, Bennett1972, Greenfield1973, Mott1973, Mott1974,
Frymire1974, ElGeneidy1974, Hardison1977, Danowski1978, Denne1992,
Ellis1992, Grau1997, Lundholm2002,
Mizzy, Inc. - Keystone Industries, Cherry Hill, NJ, 616 Hollywood Avenue, Cherry Hill,
NJ 08002, Tel: 609-663-4700, Fax: 609-663-0381, nkeystone@aol.com
(Formerly, Mizzy, Inc., New York, New York, and Clifton Forge, Virginia, USA)

Tender Touch

See: Jovanovic-Peterson1993)
See: **Medi-Jector**, above
Derata Corporation, Derata, MN

Twinjector EZ

See: Suzuki1995
Japan Chemical Research

VACCI-JET (see Dermo-Jet)

See: Krantz1970.

Velo-dermic jet

See: Hingson1957 for mention

Vitajet®

See: Rayman1989, Jackson2001, Schramm2002
<http://www.vitajet.com/>
Vitajet Corporation,
27071 Cabot Road, Suite 110, Laguna Hills, CA 92653,

714-582-0713, 800-848-2538)

Vitajet Industria e Comercio

Rio de Janeiro, Brazil

1998-99: became subsidiary of Bioject, Inc. See **Biojector® 2000**

(Genotropin®) ZipTip (identical device to Equidyne **INJEX®**, see above)

See: Dorr2003

Needle-free injection system for use with Genotropin® recombinant human growth hormone (somatropin).

Drug manufactured by Pharmacia AB, Stockholm, Sweden for Pharmacia & Upjohn Company, a subsidiary of Pharmacia Corporation, Kalamazoo, MI 49001, USA (Pharmacia merged into Pfizer in 2003).

Z&W Manufacturing Company

See: Warren1955, Hingson1957, Hingson1963

See: **Press-O-Jet**

Z&W Manufacturing Company, 1951-1958,

multidose JJ

electric powered spring compression, hand-pump syringe compression,

PATENTS (listed by number)

U.S.A. Patents (Washington, DC: United States Patent Office)

US 569887 Richardson. [Title: ???]. Issued October 1896.

US 2025219 Smith. [Title: ???]. Issued December 1935.

US 2101140 Hege. [Title: ???]. Issued December 1937.

US 2322244 Lockhart M. Hypodermic Injector. Issued 22 June 1943.

US 2380534 Lockhart M. [Title: ???]. Issued July 1945.

US 2398544 Lockhart M. Hypodermic Injector. Issued 16 April 1946. Germany patent 1082373

US 2547099 Smoot. [Title: ???]. Issued April 1951.

US 2605763 Smoot. [Title: ???]. Issued August 1952.

US 2635601 May. [Title: ???]. Issued April 1953.

US 2653602 Smoot. [Title: ???]. Issued September 1953.

- US 2680439 Sutermeister. [Title: ???]. Issued June 1954.
- US 2704543 Scherer RP. [Title: ???]. Issued March 1955.
- US 2754818 Scherer RP. [Title: ???]. Issued July 1956.
- US 2762370 Venditty. [Title: ???]. Issued September 1956.
- US 2816543 Venditty. [Title: ???]. Issued December 1957.
- US RE024419 Ziherl, et al. [Title: ???]. Issued January 1958.
- US 3123070 Kath AW. Multidose jet Injector. Issued 3 March 1964 [multi-dose, high-speed Hypospray®].
- US 3130723 Venditty. [Title: ???]. Issued April 1964.
- US 2816544 Scherer RP, et al. [Title: ???]. Issued December 1957.
- US 3057349 Ismach. [Title: ???]. Issued December 1957.
- US 3140713 Ismach. [Title: ???]. Issued July 1964.
- US 3202151 Kath AW. Multidose jet Injector. Issued 24 August 1965 [multi-dose, high-speed Hypospray®].
- US 3292621 Banker OH. [Title: ???]. Issued December 1966. [Med-E-Jet®]
- US 3292622 Banker OH. [Title: ???]. Issued December 1966. [Med-E-Jet®]
- US 3301190 [Applicant: ???][Title: ???] (Ped-O-Jet®: Vernitron, Carlstadt, NJ ???)
- US 3561443 Banker OH. Inoculator gun with delayed action. Issued 9 February 1971. [Med-E-Jet®]
- US3605745 9 /1971 Hodosh
- US3640277 2 /1972 Adelberg Medical liquid administration device
- US 3688765 Gasaway JS. Hypodermic injection device. Issued 5 September 1972.
- US3690318 9 /1972 Gorsuch. Apparatus for parenteral fluid infusion provided with variable flow control means
- US 3695266 Lussier MG. Needleless sequential dosing syringe. Issued 3 October 1972.

- US 3802430 Schwebel et al. Disposable pyrotechnically powered injector. Issued 9 April 1974.
- US 3853125 Clark WD, Hollenbeck KE. Disposable needleless injector. Issued 10 December 1974.
- US 3908651 Fudge RG (Applicant: Daystrol-Scientific, Inc.) Medicament injection device. Issued 30 September 1975.
- US 3945383 Bennett, Russell B; Millicovsky, William; Pritz, Howard B (Applicant: SmithKline Corporation). Unit dose ampul for jet injector. Issued 23 March 1976.
- US 4059107 11 /1977 Iriguchi et al. Two step type pressurized injector
- US 4065230 12 /1977 Gezari Reciprocating infusion pump and directional adapter set for use therewith
- US 4090512 Doherty NR, Doherty RF. Device for spring-loading a needleless inoculator. Issued 23 May 1978.
- US 4150672 4 /1979 Whitney et al. Injection device and method
- US 4165800 Doherty NR, Doherty RF. Device for spring-loading a needleless inoculator. Issued 28 August 1979.
- US 4266541 Landau, Sergio (Applicant: Halen-Elliot do Brazil Industria e Comercio Equipamentos de Precisaõ Ltda.). Pressure hypodermic injector for intermittent vaccination. Issued 12 May 1981.
- US 4403609 9 /1983 Cohen Vacuum-compression injector
- US 4411650 10/1983 Piston pump for needle-less injection instruments
- US 4421508 12 /1983 Cohen Vacuum-compression injector
- US 4437859 3 /1984 Whitehouse et al. Hydraulic syringe drive
- US 4447225 Taff BE, Stoller KP. Multidose jet injector. Issued 8 May 1984.
- US 4518385 5 /1985 Lindmayer et al. Disposable syringe for needleless injector
- US 4596556 Morrow JT, Covey EC (Applicant: Bioject, Inc.). Hypodermic injection apparatus. Issued 24 June 1986.

- US 4623332 Lindmayer I, Menassa K (Applicant: Patents Unlimited Ltd.). Needleless jet injector. Issued 18 November 1986.
- US 4626242 Fejes K, Nagy L (Applicant: Radelkis Elektrokemiai Muszergyarto Ipari Szovetkezet, Budapest, Hungary). Siphon-cartridge activated automatic inoculating device without needle for individual acculation [sic], e.g. for insulinization. Issued 2 December 1986.
- US 4680027 Parsons JS, Gasaway JS (Applicant: Injet Medical Products, Inc.). Needleless hypodermic injection device. Issued 14 July 1987.
- US 4722728 Dixon AJ (Applicant: Patents Unlimited, Ltd.) Issued 2 February 1988.
- US 4790824 Morrow JT, Burns M (Applicant: Bioject, Inc.). Non-invasive hypodermic injection device. Issued 13 December 1988.
- US 4874367 10 /1989 Edwards Hypodermic jet injector and cartridge therefor
- US 4913699 Parsons JS. Disposable needleless injection system. Issued 3 April 1990. [J-Tip®]
- US 5024656 6 /1991 Gasaway et al. Gas-pressure-regulated needleless injection system
- US 5026343 Holzer, Walter. Device for needleless hypodermic injection of medications. Issued 25 June 1991.
- US 5062830 11 /1991 Dunlap Dry disposable nozzle assembly for medical jet injector
- US 5064413 McKinnon, Charles M.; Nakagawa, Takaaki; Wilcox, Carl E. (Applicant: Bioject, Inc.). Needleless hypodermic injection device. Issued 12 November 1991.
- US 5073165 12 /1991 Edwards Hypodermic jet injector and cartridge therefor
- US 5074843 12 /1991 Dalto et al. Device for subcutaneous injection without a needle
- US 5080648 D'Antonio NF. Hypodermic Fluid Dispenser. Issued 14 January 1992.
- US 5116313 5 /1992 McGregor Variable intensity remote controlled needleless injectors
- US 5190523 3 /1993 Lindmayer Disposable syringe and injector

- US 5312335 McKinnon, Charles M.; Nakagawa, Takaaki; Wilcox, Carl E. (Applicant: Bioject Inc.). Needleless hypodermic injection device. Issued 17 May 1994.
- US 5318522 D'Antonio NF. Hypodermic Fluid Dispenser. Issued 7 June 1994.
- US 5334144 Alchas PG, Prais AW (Applicant: Becton, Dickinson and Company). Single use disposable needleless injector. Issued 2 August 1994.
- US 5383851 McKinnon CN, Peterson SF, Smith PE, Nakagawa T, Bartholomew VL (Assignee: Bioject, Inc.). Needleless hypodermic injection device. Issued 24 January 1995.
- US 5399163 3 /1995 Peterson et al. Needleless hypodermic injection methods and device
- US 5480381 Weston, Terence E. Needle-less injector. Issued 2 January 1996.
- US 5501666 Spielberg J (Applicant: Mycone Dental Supply Co.). Issued 26 March 1996.
- US 5503627 McKinnon, Charles M; Nakagawa, Takaaki; Wilcox, Carl E (Applicant: Bioject, Inc.). Ampule for needleless injection. Issued 2 April 1996.
- US 5503628 Fetters et al. 04/02/1996 Patient-fillable hypodermic jet injector. Issued 2 April 1996.
- US 5505697 McKinnon, Jr. et al. Electrically powered jet injector. Issued April 1996.
- US 5520639 Peterson et al. Needleless hypodermic injection methods and device. Issued May 1996
- US 5569189 Parsons; James S. (Applicant: Equidyne Systems, Inc.). Hypodermic jet injector. Issued 29 October 1996. [INJEX™ Needle-free Medication Delivery System]
- US 5569190 D'Antonio NF. Hypodermic Fluid Dispenser. Issued 29 October 1996.
- US 5599302 Lilley SJ, Taylor HF, Theobald DR, Carlson CJ, Rosen DI, Johnson TR (Applicant: Medi-Ject Corporation). Medical injection system and method, gas spring thereof and launching device using gas spring. Issued 4 February 1997.

- US 5630796 Bellhouse BJ, Sarphie DF, Greenford JC. Method of delivering powder transdermally with needleless injector. Issued 20 May 1997.
- US 5643211 07/01/1997 Nozzle assembly having a frangible plunger
- US 5697917 12/16/1997 Nozzle assembly with adjustable plunger travel gap
- US 5704911 Parsons; James S. (Applicant: Equidyne Systems, Inc.). Needleless hypodermic jet injector. Issued 6 January 1998. [INJEX™ Needle-free Medication Delivery System]
- US 5722953 03/03/1998 Nozzle assembly for injection device
- US 5730723 Castellano T, Schumecher R. (Applicant: Visionary Medical Products Corporation, Inc.) Gas pressured needle-less injection device and method. Issued 24 March 1998.
- US 5769138 06/1998 Nozzle and adapter for loading medicament into an injector
- US 5782802 07/21/1998 Multiple use needle-less hypodermic injection device for individual users
- US 5800388 09/01/1998 Plunger/ram assembly adapted for a fluid injector
- US 5836911 11/17/1998 Injection device having positioning means
- US 5846233 12/08/1998 Coupling device for medical injection system
- US 5851198 Castellano TP, Schumacher R (Applicant: Visionary Medical Products Corporation). Gas pressured needle-less injection device and method. Issued 22 December 1998.
- US 5865795 02/02/1999 Safety mechanism for injection devices
- US 5875976 03/02/1999 Locking mechanism for nozzle assembly
- US 5879327 Moreau DeFarges A, Moreau DeFarges X. Needleless jet injection device. Issued 9 March 1999.
- US 5891085 04/06/1999 Nozzle assembly with lost motion connection for medical injector assembly
- US 5893397 04/13/1999 Medication vial/syringe liquid-transfer apparatus
- US 5899879 Umbaugh JC (Applicant: Genesis Medical Technologies, Inc.).

- Spring-actuated needleless injector. Issued 4 May 1999.
- US 5911703 Slate JB, Burk MW, Gorton LA (Applicant: Avant Drug Delivery Systems, Inc.). Two-stage fluid medicament jet injector. Issued 15 June 1999.
- US 5919159 Medical injection system and method, gas spring thereof and launching device using gas spring (07/06/1999)
- US 5921967 Plunger for nozzle assembly (07/13/1999)
- US 6063053 Castellano TP. et al. Gas pressurized needle-less injection device. Issued 16 May 2000
- US 6080130 Castellano TP. Gas power source for a needleless injector. Issued 27 June 2000.
- US 6156008 Castellano TP. Gas power source for a needleless injector. Issued 05 December 2000.
- US 6223786 B1 Castellano TP (assignee: Penjet Corp.). Apparatus and method for mixing medication and filling an ampule of a needle-less injector. Issued 01 May 2001.
- US 6302160 B2 Castellano TP (assignee: Penjet Corp.). Apparatus and method for filling an ampule of a needle-less injector. Issued 16 October 2001.
- US 6447475 B1 Castellano TP (assignee: Penjet Corp.). Gas power sources for a needle-less injector and needle-less injectors incorporating the same. Issued 10 September 2002.
- US 6474369 B2 Castellano TP (assignee: Penjet Corp.). Apparatus and method for delivering a lyophilized active with a needle-less injector. Issued 05 November 2002.
- US 6500239 B2 Castellano TP (assignee: Penjet Corp.). System and method for removing dissolved gas from a solution. Issued 31 December 2002.
- US 6610042 B2 Leon N (assignee: Felton Medical, Inc.). Disposable unit-dose jet-injection syringe for pre-filled and/or transfilled liquid injectable medical drug or vaccine products and method thereof. Issued 26 August 2003.
- US 6613010 B2 Castellano TP (assignee: Penjet Corp.). Modular gas-pressured needle-less injector. Issued 2 September 2003.

US 6613011 B2 Castellano TP (assignee: Penjet Corp.). Gas-pressured engine with valve. Issued 2 September 2003.

European Patents

EP 0 106 078 B1 Dermojet S-591-H, Romania

EP 0 063 339 A2 Dettbarn H-J, Zimmermann J (Applicant: Hoechst Aktiengesellschaft). Piston pump for needleless injection apparatuses. European Patent Office, patent no. 0 063 339 A2, issued 27 October 1982.

EP 0 063 339 B1 Dettbarn H-J, Zimmermann J (Applicant: Hoechst Aktiengesellschaft). Piston pump for needleless injection apparatuses. European Patent Office, patent no. 0 063 339 B1, issued 28 August 1985.

GENERAL / MISCELLANEOUS RESOURCES - JET INJECTION

The Brother's Brother Foundation

(Founded by Robert Hingson, father of jet injection)

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<http://www.brothersbrother.org/>

CDC webpage on needle-free jet injection technology

<http://www.cdc.gov/nip/dev/jetinject.htm>

Needle-free Injection Technology News Service

<http://vaxdev.forum.cdc.gov>

Origins of jet injection experience in USA

Arnold Sutermeister, mechanical engineer noticed injections of diesel oil into workmen hands via pinholes in high-pressure oil lines. Clinical involvement by Dr. Robert Hingson, assigned to Public Health Service Hospital, Staten Island, New York City. Sutermeister and surgeon John F. Roberts developed prototype jet injector in 1933. See Pollack1971, Hingson1989.

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