# L’impression 3D en chirurgie orthognathique : principes, réglementation et étude de cas


**Laurent Douesnel**

**Roman Hossein Khonsari**

**Université Paris Cité, UFR de Médecine, Paris, France**

**Service de chirurgie maxillofaciale et chirurgie plastique, Assistance Publique – Hôpitaux de Paris, Hôpital Necker – Enfants malades, Paris, France**



**Université Paris Cité**

**2024**

https://doi.org/10.53480/imp3d.1a2c/

ISBN 978-2-7442-0214-8 (PDF)
ISBN 978-2-7442-0213-1 (imprimé)

# Bibliographie

(1) Douesnel L. Fabrication additive en chirurgie orthognathique : principes, réglementation et étude de cas [thèse d'exercice]. Université Paris Cité ; 2023. https://dumas.ccsd.cnrs.fr/dumas-04583387

(2) L'impression 3D : où en sommes-nous ? IN2P3. https://www.ias.u-psud.fr/sites/default/files/Seminaires/presentation_Seminaire_Jenzer_I3D_IAS_-Mai2018.pdf

(3) Kodama H. A scheme for three-dimensional display by automatic fabrication of three-dimensional model. IEICE Trans Electron (Japanese Ed). 1981;64: 237-41.

(4) The history of 3d printer: from rapid prototyping to additive fabrication. Sculpteo. https://www.sculpteo.com/blog/2017/03/01/whos-behind-the-three-main-3d-printing-technologies/

(5) Hull CW, Spence ST, Albert DJ, *et al.* Methods and Apparatus for Production of Three-dimensional Objects by Stereolithography. Patent No. 5059359; 1988.

(6) Cheng GZ, San Jose Estepar R, Folch E, Onieva J, Gangadharan S, Majid A. Three-dimensional Printing and 3D Slicer. Chest. 2016;149(5): 1136-42. https://doi.org/10.1016/j.chest.2016.03.001

(7) Pham DT, Gault RS. A comparison of rapid prototyping technologies. Int J Mach Tools Manuf. 1998;38(10): 1257-87. https://doi.org/10.1016/S0890-6955(97)00137-5

(8) L'histoire de l'impression 3D : les technologies d'impression 3D des années 80 à nos jours. Sculpteo. https://www.sculpteo.com/fr/centre-apprentissage/les-bases-impression-3d/histoire-impression-3d/

(9) Katstra WE, Palazzolo RD, Rowe CW, Giritlioglu B, Teung P, Cima MJ. Oral dosage forms fabricated by three dimensional printing. J Control Release. 2000;66(1): 1-9. https://doi.org/10.1016/S0168-3659(99)00225-4

(10) Ribas GC, Bento RF, Rodrigues AJ. Anaglyphic three-dimensional stereoscopic printing: revival of an old method for anatomical and surgical teaching and reporting. J Neurosurg. 2001;95(6): 1057-66. https://doi.org/10.3171/jns.2001.95.6.1057

(11) Cohen A, Laviv A, Berman P, Nashef R, Abu-Tair J. Mandibular reconstruction using stereolithographic 3-dimensional printing modeling technology. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2009;108(5): 661-6. https://doi.org/10.1016/j.tripleo.2009.05.023

(12) Tamimi F, Torres J, Gbureck U, Lopez-Cabarcos E, Bassett DC, Alkhraisat MH, *et al.* Craniofacial vertical bone augmentation: a comparison between 3D printed monolithic monetite blocks and autologous onlay grafts in the rabbit. Biomaterials. 2009;30(31): 6318-26. https://doi.org/10.1016/j.biomaterials.2009.07.049

(13) Ebert J, Ozkol E, Zeichner A, Uibel K, Weiss O, Koops U, *et al.* Direct inkjet printing of dental prostheses made of zirconia. J Dent Res. 2009;88(7): 673-6. https://doi.org/10.1177/0022034509339988

(14) 3D printing market size by offering, technology, process, application, vertical, and region – global forecast to 2029. MarketsandMarkets. https://www.marketsandmarkets.com/Market-Reports/3d-printing-market-1276.html

(15) Wohlers Report 2024: 3D printing market grew by 11.1 percent in 2023. 3Printr.com. https://www.3printr.com/wohlers-report-2024-3d-printing-market-grew-by-11-1-percent-in-2023-1470305/

(16) Rapport Wohlers 2022 : le marché de l'impression 3D retrouve des couleurs. PRIMANTE3D. https://www.primante3d.com/rapport-2022-17032022/

(17) Laverne F, Segonds F, Dubois P. Fabrication additive – Principes généraux. Techniques de l'Ingénieur. https://doi.org/10.51257/a-v2-bm7017

(18) Attaran M. The rise of 3-D printing: The advantages of additive manufacturing over traditional manufacturing. Bus Horiz. 2017;60(5): 677-88. https://doi.org/10.1016/j.bushor.2017.05.011

(19) Moussion A. Joe Biden lance un plan national pour accélérer l'impression 3D. PRIMANTE3D. https://www.primante3d.com/strategie-additive-06052022/

(20) Sinha SK. Additive manufacturing (AM) of medical devices and scaffolds for tissue engineering based on 3D and 4D printing. Dans : *3D and 4D Printing of Polymer Nanocomposite Materials*. Elsevier ; 2020. p. 119-60. https://doi.org/10.1016/B978-0-12-816805-9.00005-3

(21) Schmidt M, Pohle D, Rechtenwald T. Selective laser sintering of PEEK. CIRP Ann. 2007;56(1): 205-8. https://doi.org/10.1016/j.cirp.2007.05.097

(22) Lethaus B, Bloebaum M, Koper D, Poort-Ter Laak M, Kessler P. Interval cranioplasty with patient-specific implants and autogenous bone grafts – success and cost analysis. J Cranio-Maxillo-fac Surg. 2014;42(8): 1948-51. https://doi.org/10.1016/j.jcms.2014.08.006

(23) Rogers T. Everything you need to know about polystyrene (PS). https://www.creativemechanisms.com/blog/polystyrene-ps-plastic (consulté le 7 mai 2022)

(24) Chigwada G, Kandare E, Wang D, Majoni S, Mlambo D, Wilkie CA, *et al.* Thermal stability and degradation kinetics of polystyrene/organically-modified montmorillonite nanocomposites. J Nanosci Nanotechnol. 2008;8(4): 1927-36. https://doi.org/10.1166/jnn.2008.18258

(25) Safai L, Cuellar JS, Smit G, Zadpoor AA. A review of the fatigue behavior of 3D printed polymers. Addit Manuf. 2019;28: 87-97. https://doi.org/10.1016/j.addma.2019.03.023

(26) Zakhary KE, Thakker JS. Emerging Biomaterials in Trauma. Oral Maxillofac Surg Clin N Am. 2017;29(1): 51-62. https://doi.org/10.1016/j.coms.2016.08.010

(27) Serrano C. Impression 3D de dispositifs médicaux utilisés en chirurgie : quelles recommandations pour l'élaboration d'un modèle d'évaluation médico-économique ? [thèse de doctorat]. Université Paris-Saclay ; 2020. https://theses.hal.science/tel-03218250/

(28) Luo Y, Le Fer G, Dean D, Becker ML. 3D Printing of poly(propylene fumarate) oligomers: evaluation of resin viscosity, printing characteristics and mechanical properties. Biomacromolecules. 2019;20(4): 1699-708. https://doi.org/10.1021/acs.biomac.9b00076

(29) Druelle C. Intérêt des modèles 3D dans les malformations du squelette cranio-maxillo-facial. 7e journées de l'AIMOM (Association Internationale de Médecine Orale et Maxillo-faciale) ; 2021.

(30) Keßler A, Dosch M, Reymus M, Folwaczny M. Influence of 3D-printing method, resin material, and sterilization on the accuracy of virtually designed surgical implant guides. J Prosthet Dent. 2022;128(2): 196-204. https://doi.org/10.1016/j.prosdent.2020.08.038

(31) Winder J, Bibb R. Medical rapid prototyping technologies: state of the art and current limitations for application in oral and maxillofacial surgery. J Oral Maxillofac Surg. 2005;63(7): 1006-15. https://doi.org/10.1016/j.joms.2005.03.016

(32) Ni J, Ling H, Zhang S, Wang Z, Peng Z, Benyshek C, *et al.* Three-dimensional printing of metals for biomedical applications. Mater Today Bio. 2019;3: 100024. https://doi.org/10.1016/j.mtbio.2019.100024

(33) Attarilar S, Ebrahimi M, Djavanroodi F, Fu Y, Wang L, Yang J. 3D Printing technologies in metallic implants: A thematic review on the techniques and procedures. Int J Bioprinting. 2020;7(1): 306. https://doi.org/10.18063/ijb.v7i1.306

(34) Gorsse S, Hutchinson C, Gouné M, Banerjee R. Additive manufacturing of metals: a brief review of the characteristic microstructures and properties of steels, Ti-6Al-4V and high-entropy alloys. Sci Technol Adv Mater. 2017;18(1): 584-610. https://doi.org/10.1080/14686996.2017.1361305

(35) Goodson AM, Kittur MA, Evans PL, Williams EM. Patient-specific, printed titanium implants for reconstruction of mandibular continuity defects: A systematic review of the evidence. J Cranio-Maxillo-fac Surg. 2019;47(6): 968-76. https://doi.org/10.1016/j.jcms.2019.02.010

(36) Saini M, Singh Y, Arora P, Arora V, Jain K. Implant biomaterials: A comprehensive review. World J Clin Cases WJCC. 2015;3(1): 52-7. https://doi.org/10.12998/wjcc.v3.i1.52

(37) Woodard JR, Hilldore AJ, Lan SK, Park CJ, Morgan AW, Eurell JAC, *et al.* The mechanical properties and osteoconductivity of hydroxyapatite bone scaf-folds with multi-scale porosity. Biomaterials. 2007;28(1): 45-54. https://doi.org/10.1016/j.biomaterials.2006.08.021

(38) Kirby B, Kenkel JM, Zhang AY, Amirlak B, Suszynski TM. Three-dimensional (3D) synthetic printing for the manufacture of non-biodegradable models, tools and implants used in surgery: a review of current methods. J Med Eng Technol. 2021;45(1): 14-21. https://doi.org/10.1080/03091902.2020.1838643

(39) Ma H, Feng C, Chang J, Wu C. 3D-printed bioceramic scaffolds: From bone tissue engineering to tumor therapy. Acta Biomater. 2018;79: 37-59. https://doi.org/10.1016/j.actbio.2018.08.026

(40) Nowicki M, Castro NJ, Rao R, Plesniak M, Zhang LG. Integrating three-dimensional printing and nanotechnology for musculoskeletal regeneration. Nanotechnology. 2017;28(38): 382001. https://doi.org/10.1088/1361-6528/aa8351

(41) Trombetta R, Inzana JA, Schwarz EM, Kates SL, Awad HA. 3D printing of calcium phosphate ceramics for bone tissue engineering and drug delivery. Ann Biomed Eng. 2017;45(1): 23-44. https://doi.org/10.1007/s10439-016-1678-3

(42) Vorndran E, Klammert U, Ewald A, Barralet J, Gbureck U. Simultaneous immobilization of bioactives during 3D powder printing of bioceramic drug-release matrices. Adv Funct Mater. 2010;20: 1585-91. https://doi.org/10.1002/adfm.200901759

(43) Inzana JA, Olvera D, Fuller SM, Kelly JP, Graeve OA, Schwarz EM, *et al.* 3D printing of composite calcium phosphate and collagen scaffolds for bone regeneration. Biomaterials. 2014;35(13): 4026-34. https://doi.org/10.1016/j.biomaterials.2014.01.064

(44) Gibson I, Rosen D, Stucker B. *Additive Manufacturing Technologies*. Springer ; 2015. http://link.springer.com/10.1007/978-1-4939-2113-3

(45) NF ISO 17296-2. Fabrication additive – principes généraux. Partie 2 : vue d'ensemble des catégories de procédés et des matières de base ; 2016.

(46) Mishra A, Srivastava V. Biomaterials and 3D printing techniques used in the medical field. J Med Eng Technol. 2021;45(4): 290-302. https://doi.org/10.1080/03091902.2021.1893845

(47) Impression 3D : panorama des différentes techniques – DU facilitateur au FacLab http://cours.education/dufacilitateur/2016/07/22/limpression-3d-revue-des-differentes-techniques/ (consulté le 16 mars 2022)

(48) RIAS AL. Optimisation de la conception pour la fabrication additive, par le design et son intégration numérique [thèse de doctorat]. LCPI, Arts et métiers ParisTech; 2017.

(49) Dacosta-Noble E. Impression 3D en chirurgie maxillo-faciale : Comment un centre hospitalier se déclare fabricant de dispositif médical sur mesure. Aspect réglementaire et application au sein du Groupe Hospitalier Paris Saint Joseph [mémoire de DES]. 2019.

(50) Frittage. Wikipédia. https://fr.wikipedia.org/w/index.php?title=Frittage

(51) News B&. Post-traitement de l'impression 3D : infiltration, trovalisation et plus encore... Jellypipe. https://www.jellypipe.com/fr/blog-news/post-traitement-dans-limpression-3d/

(52) Imprimantes 3D SLS de bureau 2022 : sélection de machines et guide SLS. Aniwaa. https://www.aniwaa.fr/guide-achat/imprimantes-3d/meilleures-imprimantes-3d-sls-bureau-professionnelles/

(53) Gómez-Gras G, Jerez-Mesa R, Travieso-Rodriguez JA, Lluma-Fuentes J. Fatigue performance of fused filament fabrication PLA specimens. Materials & Design. 2018;140: 278-285. https://doi.org/10.1016/j.matdes.2017.11.072

(54) L'impression 3D par dépôt de matière sous énergie concentrée, on vous explique tout ! https://www.3dnatives.com/depot-de-matiere-sous-energie-concentree-10092019/

(55) Quelles tendances pour les ventes d'imprimantes 3D en 2021 ? PRIMANTE3D. 2022. https://www.primante3d.com/marche-additive-09022022/

(56) Digitale U. Stratasys et Airbus renforcent leur collaboration pour l'impression en 3D de pièces de maintenance. L'Usine Digitale. 2021. https://www.usine-digitale.fr/article/stratasys-renforce-sa-collaboration-avec-airbus-pour-l-impression-en-3d.N1066999

(57) Airbus : le nouvel A350 XWB contient plus de 1000 pièces imprimées en 3D. imprimeren3D.net. https://www.imprimeren3d.net/airbus-le-nouvel-a350-xwb-contient-plus-de-1-000-pieces-imprimees-en-3d-12441/

(58) Impression 3D pour l'espace - applications et avantages. Aniwaa. https://www.aniwaa.fr/guide/imprimantes-3d/industrie-spatiale-et-impression-3d/

(59) Moussion A. SpaceX : sa capsule spatiale équipée de moteurs im-primés en 3D. PRIMANTE3D. https://www.primante3d.com/spacex-impression3d-06032019/

(60) US military has project to develop additive manufacturing to make parts for military equipment for in-theater repairs. NextBigFuture.com. https://www.nextbigfuture.com/2010/10/us-military-has-project-to-develop.html

(61) Quelles sont les applications de l'impression 3D dans le secteur automobile ? 3Dnatives. https://www.3dnatives.com/impression-3d-automobile-08102020/

(62) Automotive and 3D printing: The complete guide to the 3D printed car! Sculpteo. https://www.sculpteo.com/en/3d-learning-hub/applications-of-3d-printing/3d-printed-car/

(63) Renault Group ouvre le centre d'impression 3D de sa Refactory à l'externe. 3Dnatives. https://www.3dnatives.com/renault-group-centre-impression-3d-021120223/

(64) Impression 3D. Wikipédia. https://fr.wikipedia.org/w/index.php?title=Impression_3D

(65) #Startup3D : Apis Cor et l'impression 3D de maisons. 3Dnatives. https://www.3dnatives.com/apis-cor-construction-06032018/

(66) Foodini : l'imprimante 3D alimentaire arrive en France ! eh! Online. https://ehonline.eu/foodini/

(67) Life-size prototype: turbo prop aircraft engine. RedEye. https://archive.wikiwix.com/cache/index2.php?url=https%3A%2F%2Feu.redeyeondemand.com%2FNL_December09.aspx#federation=archive.wikiwix.com

(68) Le Petit Fablab de Paris - Atelier associatif. https://lepetitfablabdeparis.fr/

(69) Lux Research. Building the Future Assessing 3D Printing's Opportunities and Challenges. https://www.scirp.org/%28S%28351jmbntvnsjt1aadkposzje%29%29/reference/references-papers.aspx?referenceid=2029114

(70) Lux Research. Led by Auto, Medical and Aerospace, 3D Printing to Grow into $8.4 Billion Market in 2025. https://www.luxresearchinc.com/press-releases/led-by-auto-medical-and-aerospace-3d-printing-to-grow-into-8-billion-market-in-2025 (consulté le 7 mai 2022)

(71) Fricain JC, De Olivera H, Devillard R, Kalisky J, Remy M, Kériquel V, *et al.* Impression 3D en médecine régénératrice et ingénierie tissulaire. médecine/sciences. 2017;33(1): 52-9. https://doi.org/10.1051/medsci/20173301009

(72) Guillemot F, Mironov V, Nakamura M. Bioprinting is coming of age: Report from the International Conference on Bioprinting and Biofabrication in Bordeaux (3B'09). Biofabrication. 2010;2(1): 010201. https://doi.org/10.1088/1758-5082/2/1/010201

(73) Potyondy T, Uquillas JA, Tebon PJ, Byambaa B, Hasan A, Tavafoghi M, *et al.* Recent advances in 3D bioprinting of musculoskeletal tissues. Biofabrication. 2021;13(2). https://doi.org/10.1088/1758-5090/abc8de

(74) Un stylo pour imprimer en 3D des cellules souches. imprimeren3D.net. https://www.imprimeren3d.net/un-stylo-pour-imprimer-en-3d-des-cellules-souches-1676/

(75) Noor N, Shapira A, Edri R, Gal I, Wertheim L, Dvir T. 3D Printing of personalized thick and perfusable cardiac patches and hearts. Adv Sci. 2019;6(11): 1900344. https://doi.org/10.1002/advs.201900344

(76) Ray MC. Nos médicaments seront-ils bientôt imprimés en 3D ? Futura. https://www.futura-sciences.com/sante/actualites/medecine-nos-medicaments-seront-ils-bientot-imprimes-3d-62328/

(77) Sadia M, Sośnicka A, Arafat B, Isreb A, Ahmed W, Kelarakis A, *et al.* Adaptation of pharmaceutical excipients to FDM 3D printing for the fabrication of patient-tailored immediate release tablets. J Controlled Release. 2016;513(1-2): 659-68. https://doi.org/10.1016/j.ijpharm.2016.09.050

(78) Sadia M, Arafat B, Ahmed W, Forbes RT, Alhnan MA. Channelled tablets: An innovative approach to accelerating drug release from 3D printed tablets. J Controlled Release. 2018;269: 355-63. https://doi.org/10.1016/j.jconrel.2017.11.022

(79) Fina F, Goyanes A, Gaisford S, Basit AW. Selective laser sintering (SLS) 3D printing of medicines. Int J Pharm. 2017;529(1-2): 285-93. https://doi.org/10.1016/j.ijpharm.2017.06.082

(80) Eisenmenger LB, Wiggins RH, Fults DW, Huo EJ. Application of 3-dimensional printing in a case of osteogenesis imperfecta for patient education, anatomic understanding, preoperative planning, and intraoperative evaluation. World Neurosurg. 2017;107: 1049.e1-1049.e7. https://doi.org/10.1016/j.wneu.2017.08.026

(81) Wong TM, Jin J, Lau TW, Fang C, Yan CH, Yeung K, *et al.* The use of three-dimensional printing technology in orthopaedic surgery. J Orthop Surg Hong Kong. 2017;25(1). https://doi.org/10.1177/2309499016684077

(82) Karsenty C, Guitarte A, Dulac Y, Briot J, Hascoet S, Vincent R, *et al.* The usefulness of 3D printed heart models for medical student education in con-genital heart disease. BMC Med Educ. 2021;21(1): 480. https://doi.org/10.1186/s12909-021-02917-z

(83) Favier V, Zemiti N, Caravaca Mora O, Subsol G, Captier G, Lebrun R, *et al.* Geometric and mechanical evaluation of 3D-printing materials for skull base anatomical education and endoscopic surgery simulation - A first step to create reliable customized simulators. PloS One. 2017;12(12): e0189486. https://doi.org/10.1371/journal.pone.0189486

(84) Nicot R, Druelle C, Schlund M, Roland-Billecart T, Gwénaël R, Ferri J, *et al.* Use of 3D printed models in student education of craniofacial traumas. Dent Traumatol Off Publ Int Assoc Dent Traumatol. 2019;35(4-5): 296-9. https://doi.org/10.1111/edt.12479

(85) Rengier F, Mehndiratta A, von Tengg-Kobligk H, Zechmann CM, Unterhinninghofen R, Kauczor HU, *et al.* 3D printing based on imaging data: review of medical applications. Int J Comput Assist Radiol Surg. 2010;5(4): 335-41. https://doi.org/10.1007/s11548-010-0476-x

(86) Pourquoi les hôpitaux se tournent vers l'impression 3D. Materialise. https://www.materialise.com/fr/blog/why-hospitals-turn-to-point-of-care-3d-printing

(87) Tack P, Victor J, Gemmel P, Annemans L. 3D-printing techniques in a medical setting: a systematic literature review. Biomed Eng Online. 2016;15(1): 115. https://doi.org/10.1186/s12938-016-0236-4

(88) Martelli N, Serrano C, van den Brink H, Pineau J, Prognon P, Borget I, *et al.* Advantages and disadvantages of 3-dimensional printing in surgery: A systematic review. Surgery. 2016;159(6): 1485-500. https://doi.org/10.1016/j.surg.2015.12.017

(89) Bergeron L, Bonapace-Potvin M, Bergeron F. In-house 3D model printing for acute cranio-maxillo-facial trauma surgery: Process, time, and costs. Plast Reconstr Surg Glob Open. 2021;9(9): e3804. https://doi.org/10.1097/GOX.0000000000003804

(90) Valding B, Zrounba H, Martinerie S, May L, Broome M. Should you buy a three-dimensional printer? A study of an orbital fracture. J Craniofac Surg. 2018;29(7): 1925-7. https://doi.org/10.1097/SCS.0000000000005048

(91) Kormi E, Männistö V, Lusila N, Naukkarinen H, Suojanen J. Accuracy of patient-specific meshes as a reconstruction of orbital floor blow-out fractures. J Craniofac Surg. 2021;32(2): e116-9. https://doi.org/10.1097/SCS.0000000000006821

(92) Zhao L, Zhang X, Guo Z, Long J. Use of modified 3D digital surgical guides in the treatment of complex mandibular fractures. J Cranio-Maxillofac Surg. 2021;49(4): 282-91. https://doi.org/10.1016/j.jcms.2021.01.016

(93) Ma J, Ma L, Wang Z, Zhu X, Wang W. The use of 3D-printed titani-um mesh tray in treating complex comminuted mandibular fractures: A case report. Medicine. 2017;96(27): e7250. https://doi.org/10.1097/MD.0000000000007250

(94) Peel S, Eggbeer D, Sugar A, Evans PL. Post-traumatic zygomatic osteotomy and orbital floor reconstruction. Rapid Prototyp J. 2016;22(6): 878-86. https://doi.org/10.1108/RPJ-03-2015-0037

(95) Damecourt A, Nieto N, Galmiche S, Garrel R, de Boutray M. In-house 3D treatment planning for mandibular reconstruction by free fibula flap in cancer: Our technique. Eur Ann Otorhinolaryngol Head Neck Dis. 2020;137(6): 501-5. https://doi.org/10.1016/j.anorl.2020.02.002

(96) Popov VV, Muller-Kamskii G, Kovalevsky A, Dzhenzhera G, Strokin E, Kolomiets A, *et al.* Design and 3D-printing of titanium bone implants: brief review of approach and clinical cases. Biomed Eng Lett. 2018;8(4): 337-44. https://doi.org/10.1007/s13534-018-0080-5

(97) Dupret-Bories A, Vergez S, Meresse T, Brouillet F, Bertrand G. Contribution of 3D printing to mandibular reconstruction after cancer. Eur Ann Otorhinolaryngol Head Neck Dis. 2018;135(2): 133-6. https://doi.org/10.1016/j.anorl.2017.09.007

(98) Villa S, Druelle C, Juliéron M, Nicot R. [3D-assisted mandibular re-construction: A technical note of fibula free flap with preshaped titanium plate]. Ann Chir Plast Esthet. 2021;66(2): 174-9. https://doi.org/10.1016/j.anplas.2020.07.001

(99) Ciocca L, Mazzoni S, Fantini M, Persiani F, Marchetti C, Scotti R. CAD/CAM guided secondary mandibular reconstruction of a discontinuity defect after ablative cancer surgery. J Cranio-Maxillofac Surg. 2012;40(8): e511-5. https://doi.org/10.1016/j.jcms.2012.03.015

(100) Bartier S, Mazzaschi O, Benichou L, Sauvaget E. Computer-assisted versus traditional technique in fibular free-flap mandibular reconstruction: A CT symmetry study. Eur Ann Otorhinolaryngol Head Neck Dis. 2021;138(1): 23-7. https://doi.org/10.1016/j.anorl.2020.06.011

(101) Ni Y, Zhang X, Meng Z, Li Z, Li S, Xu ZF, *et al.* Digital navigation and 3D model technology in mandibular reconstruction with fibular free flap: A comparative study. J Stomatol Oral Maxillofac Surg. 2021;122(4): e59-64. https://doi.org/10.1016/j.jormas.2020.11.002

(102) Schouman T, Bertolus C, Chaine C, Ceccaldi J, Goudot P. Chirurgie assistée par dispositifs sur-mesure : reconstruction par lambeau libre de fibula. Rev Stomatol Chir Maxillo-Faciale Chir Orale. 2014;115(1): 28-36. https://doi.org/10.1016/j.revsto.2013.09.002

(103) Laure B, Louisy A, Joly A, Travers N, Listrat A, Pare A. Virtual 3D planning of osteotomies for craniosynostoses and complex craniofacial malformations. Neurochirurgie. 2019;65(5): 269-78. https://doi.org/10.1016/j.neuchi.2019.09.012

(104) Mommaerts MY, Depauw PR, Nout E. Ceramic 3D-printed titanium cranioplasty. Craniomaxillofacial Trauma Reconstr. 2020;13(4): 329-33. https://doi.org/10.1177/1943387520927916

(105) Jaumotte M, Grobet P, Pepinster F, Thonnart F, Nizet JL, Gilon Y. Apport de la technologie 3D en chirurgie maxillo-faciale. Rev Med Liege. 2020;75(4): 240-2.

(106) Eggbeer DD, Evans P, Sugar A. CARTIS Evidence to Commission on the Future of Surgery. Royal College of Surgeons, 2018.

(107) Tan A, Chai Y, Mooi W, Chen X, Xu H, Zin MA, *et al.* Computer-assisted surgery in therapeutic strategy distraction osteogenesis of hemifacial microsomia: Accuracy and predictability. 2019;47(2): 204-18. https://doi.org/10.1016/j.jcms.2018.11.014

(108) Thrivikraman G, Athirasala A, Twohig C, Boda SK, Bertassoni LE. Biomaterials for craniofacial bone regeneration. Dent Clin North Am. 2017;61(4): 835-56. https://doi.org/10.1016/j.cden.2017.06.003

(109) Bibb R, Eggbeer D, Evans P. Rapid prototyping technologies in soft tissue facial prosthetics: current state of the art. Rapid Prototyp J. 2010;16(2): 130-7. https://doi.org/10.1108/13552541011025852

(110) Daniel S, Eggbeer D. A CAD and AM process for maxillofacial prostheses bar-clip retention. Rapid Prototyp J. 2016;22(1): 170-7. https://doi.org/10.1108/RPJ-03-2014-0036

(111) L'impression 3D est-elle possible avec du silicone? Beamler. https://www.beamler.com/fr/limpression-3d-est-elle-possible-avec-du-silicone/

(112) Toulouse. Le nez d'une patiente totalement reconstruit après avoir été implanté dans son avant bras. actu.fr. https://actu.fr/occitanie/toulouse_31555/toulouse-le-nez-d-une-patiente-totalement-reconstruit-apres-avoir-ete-implante-dans-son-avant-bras_55044571.html

(113) La Padula S, Hersant B, Chatel H, Aguilar P, Bosc R, Roccaro G, *et al.* One-step facial feminization surgery: The importance of a custom-made pre-operative planning

and patient satisfaction assessment. J Plast Reconstr Aesthet Surg. 2019;72(10): 1694-9. https://doi.org/10.1016/j.bjps.2019.06.014

(114) Yang F, Chen C, Zhou Q, Gong Y, Li R, Li C, *et al.* Laser beam melting 3D printing of Ti6Al4V based porous structured dental implants: fabrication, biocompatibility analysis and photoelastic study. Sci Rep. 2017;7(1): 45360. https://doi.org/10.1038/srep45360

(115) Dawood A, Marti Marti B, Sauret-Jackson V, Darwood A. 3D printing in dentistry. Br Dent J. 2015;219(11): 521-9. https://doi.org/10.1038/sj.bdj.2015.914

(116) Badiali G, Bevini M, Lunari O, Lovero E, Ruggiero F, Bolognesi F, *et al.* PSI-guided mandible-first orthognathic surgery: maxillo-mandibular position accuracy and vertical dimension adjustability. J Pers Med. 2021;11(11): 1237. https://doi.org/10.3390/jpm11111237

(117) Shen S, Jiang T, Shen SG, Wang X. A reversed approach for simultaneous mandibular symphyseal split osteotomy and genioplasty. Int J Oral Maxillofac Surg. 2019;48(9): 1209-12. https://doi.org/10.1016/j.ijom.2019.01.012

(118) Watson J, Hatamleh M, Alwahadni A, Srinivasan D. Correction of facial and mandibular asymmetry using a computer aided design/computer aided manufacturing prefabricated titanium implant. J Craniofac Surg. 2014;25(3): 1099-101. https://doi.org/10.1097/SCS.0000000000000659

(119) Hatamleh M, Turner C, Bhamrah G, Mack G, Osher J. Improved virtual planning for bimaxillary orthognathic surgery. J Craniofac Surg. 2016;27(6): e568-73. https://doi.org/10.1097/SCS.0000000000002877

(120) Hatamleh MM, Bhamrah G, Ryba F, Mack G, Huppa C. Simultaneous computer-aided design/computer-aided manufacture bimaxillary orthognathic surgery and mandibular reconstruction using selective-laser sintered titanium implant. J Craniofac Surg. 2016;27(7): 1810-4. https://doi.org/10.1097/SCS.0000000000003039

(121) Bach E, Breton P, Cousin AS, Louvrier A, Sigaux N. Prothèses d'articulation temporo-mandibulaire. Rev Prat. 2020;70(10): 1129-33. https://www.larevuedu-praticien.fr/article/protheses-darticulation-temporo-mandibulaire

(122) Gerbino G, Autorino U, Borbon C, Marcolin F, Olivetti E, Vezzetti E, *et al.* Malar augmentation with zygomatic osteotomy in orthognatic surgery: Bone and soft tissue changes threedimensional evaluation. J Cranio-Maxillo-fac Surg. 2021;49(3): 223-30. https://doi.org/10.1016/j.jcms.2021.01.008

(123) Loi n° 2021-1018 du 2 août 2021 pour renforcer la prévention en santé au travail.

(124) Code du travail. Légifrance. https://www.legifrance.gouv.fr/codes/id/LEGITEXT00000607-2050

(125) Règlement (UE) 2017/745 du Parlement européen et du Conseil du 5 avril 2017 relatif aux dispositifs médicaux, modifiant la directive 2001/83/CE, le règlement (CE) n° 178/2002 et le règlement (CE) n° 1223/2009 et abrogeant les directives du Conseil 90/385/CEE et 93/42/CEE.

(126) Lucido S. EU medical device regulation still presents challenges and opportunities. AssurX Quality Management Software. https://www.assurx.com/eu-medical-device-regulation-still-presents-challenges-and-opportunities/

(127) SNITEM. Guide sur l'application du règlement (UE) 2017/745 relatif aux dispositifs médicaux à destination des établissements de santé.

(128) Celli B, Labbe D. Désignation des organismes notifiés. ANSM, 2018.

(129) Ghislain J-C. Enjeux et grands principes attendus de la part des fabricants. ANSM, 2018.

(130) Prothèses mammaires PIP : chronologie d'un scandale. Le Monde. https://www.lemonde.fr/societe/article/2012/01/18/les-grandes-dates-du-scandale-des-implants-pip_1625045_3224.html

(131) GMED Medical Device Certification. https://lne-gmed.com/fr

(132) EUDAMED database. https://ec.europa.eu/tools/eudamed/#/screen/home

(133) Martelli N, Eskenazy D, Déan C, Pineau J, Prognon P, Chatellier G, *et al.* New european regulation for medical devices: what is changing? Cardiovasc Intervent Radiol. 2019;42(9): 1272-8. https://doi.org/10.1007/s00270-019-02247-0

(134) Migliore A. On the new regulation of medical devices in Europe. Expert Rev Med Devices. 2017;14(12): 921-3. https://doi.org/10.1080/17434440.2017.1407648

(135) Article L5211-1 du Code de la santé publique. https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000021964486/

(136) Conseil européen. Directive 93/42/CEE du Conseil du 14 juin 1993 relative aux dispositifs médicaux.

(137) Parlement européen. Directive 2007/47/CE du Parlement européen et du Conseil du 5 septembre 2007.

(138) Qualification et classification des dispositifs médicaux, dispositifs médicaux in-house, webinar #2. https://www.youtube.com/watch?v=r0RuL9ol7Fk

(139) Council Directive 93/42/EEC of 14 June 1993 concerning medical devices. Official Journal of The European Communities L 169, 12.7.1993, 1-43. https://eur-lex.europa.eu/legal-content/EN/ALL/?uri=celex%3A31993L0042

(140) French-Mowat E, Burnett J. How are medical devices regulated in the European Union? J R Soc Med. 2012;105(S1): 22-8. https://doi.org/10.1258/jrsm.2012.120036

(141) Comment choisir la bonne classe pour son dispositif médical ? Certification Iso – Formation et accompagnement. https://www.france-certification.com/2014/04/07/comment-choisir-la-bonne-classe-pour-son-dispositif-medical/ (consulté le 10 avril 2022)

(142) MDCG endorsed documents and other guidance https://ec.europa.eu/health/medical-devices-sector/new-regulations/guidance-mdcg-endorsed-documents-and-other-guidance_en

(143) Règlement (UE) n° 722/2012 de la Commission du 8 août 2012 relatif aux prescriptions particulières en ce qui concerne les exigences prévues aux directives 90/385/CEE et 93/42/CEE du Conseil pour les dispositifs médicaux implantables actifs et les dispositifs médicaux fabriqués à partir de tissus d'origine animale présentant de l'intérêt pour l'EEE.

(144) Qualification et classification des dispositifs médicaux, dispositifs médicaux in-house, webinar #3. https://www.youtube.com/watch?v=r0RuL9ol7Fk

(145) Definitions for Personalized Medical Devices. 2018. https://www.imdrf.org/sites/default/files/docs/imdrf/final/technical/imdrf-tech-181018-pmd-definitions-n49.pdf

(146) Europharmat. Fiche pratique : Processus de fabrication de DM dans les établissements de santé. https://www.euro-pharmat.com/autres-outils/4728-fiche-pratique-processus-fabrication-de-dm-dans-les-etablissements-de-sante

(147) Sugar A, Bibb R, Morris C, Parkhouse J. The development of a collaborative medical modelling service: organisational and technical considerations. Br J Oral Maxillofac Surg. 2004;42(4): 323-30. https://doi.org/10.1016/j.bjoms.2004.02.025

(148) Pajot T, Benichou L, Moreau E, Tallon V, Meningaud JP, Khonsari RH, *et al.* Implementation of a digital chain for the design and manufacture of implant-based surgical guides in a hospital setting. J Stomatol Oral Maxillofac Surg. 2020;121(4): 347-51. https://doi.org/10.1016/j.jormas.2019.09.009

(149) Planification 3D en chirurgie maxillo-faciale. Revue Medicale Suisse. https://www.revmed.ch/revue-medicale-suisse/2014/revue-medicale-suisse-444/planification-3d-en-chirurgie-maxillo-faciale

(150) Qu'est-ce qu'un fichier STL ? 3D Systems. https://fr.3dsystems.com/quickparts/learning-center/what-is-stl-file

(151) Norme ISO 11137 pour la stérilisation des produits de santé Ionisos. https://www.ionisos.com/norme-iso-11137/

(152) Comité technique de matériovigilance et de réactovigilance, CT042014043, Compte rendu de séance. https://archive.ansm.sante.fr/var/ansm_site/storage/original/application/7ede51c7c97bd00f24f05b5e9fdcc1ec.pdf

(153) Pierreville J, Serrano C, van den Brink H, Prognon P, Pineau J, Martelli N. Dispositifs médicaux et modèles anatomiques produits par impression 3D : quelle diffusion et quelles utilisations dans les établissements de santé français ? Ann Pharm Fr. 2018;76(2): 139-46. https://doi.org/10.1016/j.pharma.2017.12.001

(154) Goodson AMC, Parmar S, Ganesh S, Zakai D, Shafi A, Wicks C, *et al.* Printed titanium implants in UK craniomaxillofacial surgery. Part I: access to digital planning and perceived scope for use in common procedures. Br J Oral Maxillofac Surg. 2021;59(3): 312-9. https://doi.org/10.1016/j.bjoms.2020.08.087

(155) Goodson AMC, Parmar S, Ganesh S, Zakai D, Shafi A, Wicks C, *et al.* Printed titanium implants in UK craniomaxillofacial surgery. Part II: perceived performance (outcomes, logistics, and costs). Br J Oral Maxillofac Surg. 2021;59(3): 320-8. https://doi.org/10.1016/j.bjoms.2020.08.088

(156) L'accord de retrait entre l'UE et le Royaume-Uni. Commission européenne. https://ec.europa.eu/info/strategy/relations-non-eu-countries/relations-united-kingdom/eu-uk-withdrawal-agreement_fr

(157) ISO 13485 – Medical devices. https://www.iso.org/iso-13485-medical-devices.html

(158) Medical devices: EU regulations for MDR and IVDR. Medicines and Healthcare products Regulatory Agency, 2017; updated 2020. https://www.gov.uk/guidance/medical-devices-eu-regulations-for-mdr-and-ivdr

(159) Draft guidance on the health institution exemption (HIE) – IVDR and MDR, 2017. https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/675419/Health_institution_exemption_draft_for_public_consultation.pdf

(160) Scott N. Developing an in-house 3D design and manufacture service. Paper presented at the Advanced Digital Technologies (ADT) Foundation UK conference. Swansea, 15 June 2018.

(161) Yi J, LeBouf RF, Duling MG, Nurkiewicz T, Chen BT, Schwegler-Berry D, *et al.* Emission of particulate matter from a desktop three-dimensional (3D) printer. J Toxicol Environ Health A. 2016;79(11): 453-65. https://doi.org/10.1080/15287394.2016.1166467

(162) Stefaniak AB, LeBouf RF, Yi J, Ham J, Nurkewicz T, Schwegler-Berry DE, *et al.* Characterization of chemical contaminants generated by a desktop fused deposition modeling 3-dimensional Printer. J Occup Environ Hyg. 2017;14(7): 540-50. https://doi.org/10.1080/15459624.2017.1302589

(163) Ligon SC, Liska R, Stampfl J, Gurr M, Mülhaupt R. Polymers for 3D printing and customized additive manufacturing. Chem Rev. 2017;117(15): 10212-90. https://doi.org/10.1021/acs.chemrev.7b00074

(164) Kuwayama T, Ruehl CR, Kleeman MJ. Daily trends and source apportionment of ultrafine particulate mass (PM0.1) over an annual cycle in a typical California city. Environ Sci Technol. 2013;47(24): 13957-66. https://doi.org/10.1021/es403235c

(165) Oberdorster G, Gelein RM, Ferin J, Weiss B. Association of particulate air pollution and acute mortality: involvement of ultrafine particles? Inhal Toxicol. 1995;7(1): 111-24. https://doi.org/10.3109/08958379509014275

(166) Farcas MT, Stefaniak AB, Knepp AK, Bowers L, Mandler WK, Kashon M, *et al.* Acrylonitrile butadiene styrene (ABS) and polycarbonate (PC) filaments three-dimensional (3-D) printer emissions-induced cell toxicity. Toxicol Lett. 2019;317: 1-12. https://doi.org/10.1016/j.toxlet.2019.09.013

(167) Bond JA. Review of the toxicology of styrene. Crit Rev Toxicol. 1989;19(3): 227-49. https://doi.org/10.3109/10408448909037472

(168) Poikkimäki M, Koljonen V, Leskinen N, Närhi M, Kangasniemi O, Kausiala O, *et al.* Nanocluster aerosol emissions of a 3D printer. Environ Sci Technol. 2019;53(23): 13618-28. https://doi.org/10.1021/acs.est.9b05317

(169) Leso V, Ercolano ML, Mazzotta I, Romano M, Cannavacciuolo F, Iavicoli I. Three-dimensional (3D) printing: implications for risk assessment and management in occupational settings. Ann Work Expo Health. 2021;65(6): 617-34. https://doi.org/10.1093/annweh/wxaa146

(170) Tout savoir sur l'impression 3D métal. 3Dnatives. https://www.3dnatives.com/impression-3d-metal/

(171) Bau S, Rousset D, Payet R, Keller FX. Characterizing particle emissions from a direct energy deposition additive manufacturing process and associat-ed occupational exposure to airborne particles. J Occup Environ Hyg. 2020;17(2-3): 59-72. https://doi.org/10.1080/15459624.2019.1696969

(172) Chen R, Yin H, Cole IS, Shen S, Zhou X, Wang Y, *et al.* Exposure, assessment and health hazards of particulate matter in metal additive manufacturing: A review. Chemosphere. 2020;259: 127452. https://doi.org/10.1016/j.chemosphere.2020.127452

(173) Wang Y, Chen L, Chen R, Tian G, Li D, Chen C, *et al.* Effect of relative humidity on the deposition and coagulation of aerosolized SiO2 nanoparticles. Atmospheric Res. 2017;194: 100-8. https://doi.org/10.1016/j.atmosres.2017.04.030

(174) Quels sont les risques liés à l'impression 3D FDM et métallique ? 3Dnatives. https://www.3dnatives.com/dangers-impression-3d-fdm-metal-180520203/

(175) CDC. 3D Printing with Metal Powders: Health and Safety Questions to Ask. https://www.cdc.gov/niosh/docs/2020-114/default.html

(176) Liu L, Breitner S, Schneider A, Cyrys J, Brüske I, Franck U, *et al.* Size-fractioned particulate air pollution and cardiovascular emergency room visits in Beijing, China. Environ Res. 2013;121: 52-63. https://doi.org/10.1016/j.envres.2012.10.009

(177) Su C, Hampel R, Franck U, Wiedensohler A, Cyrys J, Pan X, *et al.* Assessing responses of cardiovascular mortality to particulate matter air pollution for pre-, during- and post-2008 Olympics periods. Environ Res. 2015;142: 112-22. https://doi.org/10.1016/j.envres.2015.06.025

(178) Cascio WE, Cozzi E, Hazarika S, Devlin RB, Henriksen RA, Lust RM, *et al.* Cardiac and vascular changes in mice after exposure to ultrafine particulate matter. Inhal Toxicol. 2007;19(Suppl 1): 67-73. https://doi.org/10.1080/08958370701493456

(179) Courtois A, Andujar P, Ladeiro Y, Baudrimont I, Delannoy E, Le-blais V, *et al.* Impairment of NO-dependent relaxation in intralobar pulmonary ar-teries: comparison of urban particulate matter and manufactured nanoparticles. Environ Health Perspect. 2008;116(10): 1294-9. https://doi.org/10.1289/ehp.11021

(180) Samet JM, Rappold A, Graff D, Cascio WE, Berntsen JH, Huang YCT, *et al.* Concentrated ambient ultrafine particle exposure induces cardiac changes in young healthy volunteers. Am J Respir Crit Care Med. 2009;179(11): 1034-42. https://doi.org/10.1164/rccm.200807-1043OC

(181) Stefaniak AB, LeBouf RF, Duling MG, Yi J, Abukabda AB, McBride CR, *et al.* Inhalation exposure to three-dimensional printer emissions stimulates acute hypertension and microvascular dysfunction. Toxicol Appl Pharmacol. 2017;335: 1-5. https://doi.org/10.1016/j.taap.2017.09.016

(182) Chan FL, House R, Kudla I, Lipszyc JC, Rajaram N, Tarlo SM. Health survey of employees regularly using 3D printers. Occup Med. 2018;68(3): 211-4. https://doi.org/10.1093/occmed/kqy042

(183) House R, Rajaram N, Tarlo SM. Case report of asthma associated with 3D printing. Occup Med. 2017;67(8): 652-4. https://doi.org/10.1093/occmed/kqx129

(184) Gümperlein I, Fischer E, Dietrich-Gümperlein G, Karrasch S, Nowak D, Jörres RA, *et al.* Acute health effects of desktop 3D printing (fused deposition modeling) using acrylonitrile butadiene styrene and polylactic acid materials: An experimental exposure study in human volunteers. Indoor Air. 2018;28(4): 611-23. https://doi.org/10.1111/ina.12458

(185) Zontek TL, Ogle BR, Jankovic JT, Hollenbeck SM. An exposure assessment of desktop 3D printing. J Chem Health Saf. 2017;24(2): 15-25. https://doi.org/10.1016/j.jchas.2016.05.008

(186) Stefaniak AB, Johnson AR, du Preez S, Hammond DR, Wells JR, Ham JE, *et al.* Insights into emissions and exposures from use of industrial-scale additive manufacturing machines. Saf Health Work. 2019;10(2): 229-36. https://doi.org/10.1016/j.shaw.2018.10.003

(187) Oberbek P, Kozikowski P, Czarnecka K, Sobiech P, Jakubiak S, Jankowski T. Inhalation exposure to various nanoparticles in work environment-contextual information and results of measurements. J Nanoparticle Res. 2019;21(11): 222. https://doi.org/10.1007/s11051-019-4651-x

(188) Gu J, Uhde E, Wensing M, Xia F, Salthammer T. Emission control of desktop 3D printing: the effects of a filter cover and an air purifier. Environ Sci Technol Lett. 2019;6(8): 499-503. https://doi.org/10.1021/acs.estlett.9b00376

(189) Kwon O, Yoon C, Ham S, Park J, Lee J, Yoo D, *et al.* Characterization and control of nanoparticle emission during 3D printing. Environ Sci Technol. 2017;51(18): 10357-68. https://doi.org/10.1021/acs.est.7b01454

(190) Viitanen AK, Kallonen K, Kukko K, Kanerva T, Saukko E, Hussein T, *et al.* Technical control of nanoparticle emissions from desktop 3D printing. Indoor Air. 2021;31(4): 1061-71. https://doi.org/10.1111/ina.12791

(191) Ljunggren SA, Karlsson H, Ståhlbom B, Krapi B, Fornander L, Karlsson LE, *et al.* Biomonitoring of metal exposure during additive manufacturing (3D printing). Saf Health Work. 2019;10(4): 518-26. https://doi.org/10.1016/j.shaw.2019.07.006

(192) Qu'est-ce que la chirurgie orthognatique : définition et traitements. Clinique Maxillo-Faciale. https://cliniquemaxillo.com/blogue/chirurgie-orthognatique-que-traite-elle/

(193) Kerbrat A, Kerbrat JB, N'Diaye M, Goudot P, Schouman T. Place de l'innovation dans la chirurgie orthognathique du syndrome d'apnées obstructives du sommeil. Orthod Fr. 2019;90(3-4): 415-22. https://doi.org/10.1051/orthodfr/2019026

(194) Bouletreau P, Raberin M, Freidel M, Breton P. Orthognathic surgery is a team work! Orthod Fr. 2010;81(2): 157-64. https://doi.org/10.1051/orthodfr/2010017

(195) Kerbrat A, Kerbrat JB, Bourlon AS, Schouman T, Goudot P. L'approche pluridisciplinaire des protocoles chirurgico-orthodontiques du service de chirurgie maxillo-faciale de l'hôpital Pitié-Salpêtrière. Rev Orthopédie Dento-Faciale. 2016;50(2): 183-7. https://doi.org/10.1051/odf/2016006

(196) Philip-Alliez C, Chouvin M, Salvadori A. Diagnostic de l'indication orthodontico-chirurgicale Dans *Dysmorphies maxillo-mandibulaires – Traitement orthodontico-chirurgical*. Elsevier ; 2012. https://doi.org/10.1016/B978-2-294-71007-0.00001-5

(197) Cheever DW. Displacement of the upper jaw. Med Surg Rep Boston City Hosp 1870;1: 156.

(198) Le Fort R, Tessier P. Experimental study of fractures of the upper jaw. Parts I and II. Plastic and Reconstructive Surgery. 1972;50(5): 497-506. https://doi.org/10.1097/00006534-197211000-00012

(199) Wassmun M. *Frakuren und Luxationen des Gesichtsschadels*. Meusser ; 1927.

(200) Buchanan E, Hyman C. LeFort I Osteotomy. Semin Plast Surg. 2013;27(3): 149-54. https://doi.org/10.1055/s-0033-1357112

(201) Axhausen G. Zur Behandlung veralteter disloziert geheilter Oberkieferbruche. Dstch Zahn Mund Kieferheilkd. 1934;1: 334.

(202) Bell WH. Le Forte I osteotomy for correction of maxillary deformities. J Oral Surg Am Dent Assoc. 1965. 1975;33(6): 412-26.

(203) Bell W, Kl M. Correction of the long face syndrome by Le Fort I osteotomy. A report on some new technical modifications and treatment results. Oral Surg Oral Med Oral Pathol. 1977;44(4). https://doi.org/10.1016/0030-4220(77)90292-4

(204) Schendel SA, Eisenfeld JH, Bell WH, Epker BN. Superior repositioning of the maxilla: stability and soft tissue osseous relations. Am J Orthod. 1976;70(6): 663-74. https://doi.org/10.1016/0002-9416(76)90226-8

(205) Garcia R, Deffrennes D, Richter M, Mossaz C, Canal P, Tulasne JF, Goudot P. Traitement orthodontico-chirurgical - Plans de traitement et prise en charge (situations cliniques). Dans *Dysmorphies maxillo-mandibulaires*. Elsevier Masson ; 2012.

(206) Schuchardt K. Die Chirurgie als Helferin der Kieferorthopädie. Fortschritte Kieferorthopädie. 1954;15(1): 1-25. https://doi.org/10.1007/BF02167252

(207) Peri G, Vaillant JM, Grellet M. The Trauner-Obwegeser technic in the treatment of mandibular prognathism. Ann Chir Plast. 1968;13(1): 23-9.

(208) Dal Pont G. Retromolar osteotomy for the correction of prognathism. J Oral Surg Anesth Hosp Dent Serv. 1961;19: 42-7.

(209) Epker BN. Modifications in the sagittal osteotomy of the mandible. J Oral Surg Am Dent Assoc 1965. 1977;35(2): 157-9.

(210) G. Deffrennes, J. Ferri, E. Garreau, D. Deffrennes. Ostéotomies maxillomandibulaires : bases fondamentales et analytiques clinique. Traité EMC; 2018.

(211) Béziat JL. *Chirurgie orthognathique piézoélectrique*. EDP Sciences ; 2013.

(212) Gola R. *Rhinoplastie fonctionnelle et esthétique*. Springer Science & Business Media; 2000.

(213) Chardain J. Techniques de chirurgie correctrice des mâchoires. https://www.chirurgien-maxillo-facial.com/chirurgie-correctrice-des-machoires/techniques-chirurgicales/

(214) La Chirurgie Orthognathique I : Diagnostic d'une Dysmorphie Maxillo-Mandibulaire (DMM). Fadim ; 2019. https://www.fadim.com/fra/2019/05/06/la-chirurgie-orthognathique-i-diagnostic-dune-dysmorphie-maxillo-mandibulaire-dmm/

(215) Nicot R, Raoul G, Ferri J. Hypercondylie. Traité EMC ; 2019.

(216) Bartlett S, Ehrenfeld M, Mast G, Sugar A. Planning of orthognathic surgery. AO Surgery Reference. https://surgeryreference.aofoundation.org/cmf/orthognathic/further-reading/planning-of-orthognathic-surgery

(217) David Picovski D. Rhinoplastie chez l'homme : les particularités. https://docteur-picovski.com/blog/rhinoplastie-homme-particularites/

(218) La ligne esthétique de Ricketts. The Dentalist ; 2014. http://thedentalist.fr/lanalyse-du-profil-2/

(219) Le bridge collé cantilever : une alternative pour les cas d'édentement antérieur unitaire. https://docplayer.fr/136845411-Le-bridge-colle-cantilever-une-alternative-pour-les-cas-d-edentement-anterieur-unitaire.html

(220) Ligne esthétique de Rickett et positionnement théorique des vermillons. Le monde en images. https://monde.ccdmd.qc.ca/ressource/?id=122294

(221) Collège national des enseignants de chirurgie maxillo-faciale et de chirurgie orale. *Chirurgie maxillo-faciale et stomatologie*. 4e édition. Elsevier Masson.

(222) Hauteville DA. Courbe de Spee et courbe de Wilson. https://conseildentaire.com/courbe-de-spee-courbe-de-wilson/

(223) Angle EH. *Treatment of malocclusion of teeth and fractures of the maxillae. Angle's system.* WB Saunders ; 1900.

(224) Reyneke JP. Surgical manipulation of the occlusal plane: new concepts in geometry. Int J Adult Orthodon Orthognath Surg. 1998;13(4): 307-16.

(225) Landouzy M, Sergent Delattre A, Fenart R, Delattre B, Claire J, Biecq M. La langue : déglutition, fonctions oro-faciales, croissance crânio-faciale. Int. Orthod. 2009;1611(3): 227-304.

(226) Dot G, Rafflenbeul F, Arbotto M, Gajny L, Rouch P, Schouman T. Accuracy and reliability of automatic three-dimensional cephalometric landmarking. Int J Oral Maxillofac Surg. 2020;49(10): 1367-78. https://doi.org/10.1016/j.ijom.2020.02.015

(227) Dot G, Rafflenbeul F, Kerbrat A, Rouch P, Gajny L, Schouman T. Three-dimensional cephalometric landmarking and frankfort horizontal plane construction: Reproducibility of conventional and novel landmarks. J Clin Med. 2021;10(22): 5303. https://doi.org/10.3390/jcm10225303

(228) Delaire J, Schendel SA, Tulasne JF. An architectural and structural craniofacial analysis: a new lateral cephalometric analysis. Oral Surg Oral Med Oral Pathol. 1981;52(3): 226-38. https://doi.org/10.1016/0030-4220(81)90252-8

(229) Sassouni V. A roentgenographic cephalometric analysis of cepha-lo-facio-dental relationships. Am J Orthod. 1955;41(10): 735-64. https://doi.org/10.1016/0002-9416(55)90171-8

(230) Sassouni V. Diagnosis and treatment planning via roentgenographic cephalometry. Am J Orthod. 1958;44(6): 433-63. https://doi.org/10.1016/0002-9416(58)90003-4

(231) L'analyse architecturale cranio-faciale de Delaire. Revue de Stomatologie et de Chirurgie Maxillo-Faciale. 2000;965(1): 3-43. https://doi.org/RSTO-03-2000-101-1-0035-1768-101019-BKR99

(232) Rousseau A. Analyse de Sassouni, comment la tracer ?

(233) Pascal E, Majoufre C, Bondaz M, Courtemanche A, Berger M, Bouletreau P. Current status of surgical planning and transfer methods in orthognathic surgery. J Stomatol Oral Maxillofac Surg. 2018;119(3): 245-8. https://doi.org/10.1016/j.jormas.2018.02.001

(234) Lutz JC, Hostettler A, Agnus V, Nicolau S, George D, Soler L, *et al.* A new software suite in orthognathic surgery: Patient specific modeling, simulation and navigation. Surg Innov. 2019;26(1): 5-20. https://doi.org/10.1177/1553350618803233

(235) Anand M, Panwar S. Role of navigation in oral and maxillofacial surgery: A surgeon's perspectives. Clin Cosmet Investig Dent. 2021;13: 127-39. https://doi.org/10.2147/CCIDE.S299249

(236) Bobek SL. Applications of navigation for orthognathic surgery. Oral Maxillofac Surg Clin N Am. 2014;26(4): 587-98. https://doi.org/10.1016/j.coms.2014.08.003

(237) Zinser MJ, Mischkowski RA, Dreiseidler T, Thamm OC, Rothamel D, Zöller JE. Computer-assisted orthognathic surgery: waferless maxillary positioning, versatility, and accuracy of an image-guided visualisation display. Br J Oral Maxillofac Surg. 2013;51(8): 827-33. https://doi.org/10.1016/j.bjoms.2013.06.014

(238) Eales EA, Newton C, Jones ML, Sugar A. The accuracy of computerized prediction of the soft tissue profile: a study of 25 patients treated by means of the Le Fort I osteotomy. Int J Adult Orthodon Orthognath Surg. 1994;9(2): 141-52.

(239) Bamber MA, Vachiramon A. Surgical wafers: A comparative study. J Contemp Dent Pract. 2005;6(2): 99-106.

(240) Bamber MA, Harris M. The role of the occlusal wafer in orthognathic surgery; a comparison of thick and thin intermediate osteotomy wafers. J Cranio-Maxillofac Surg. 1995;23(6): 396-400. https://doi.org/10.1016/S1010-5182(05)80137-4

(241) Swinkels W *et al.* Cloud-based orthognathic surgical planning platform. IEEE 13th International New Circuits and Systems Conference (NEWCAS); 2015. https://doi.org/10.1109/NEWCAS.2015.7182051

(242) Bartlett S, Ehrenfeld M, Mast G, Sugar A. Two jaw surgery. AO Surgery Reference. https://surgeryreference.aofoundation.org/cmf/orthognathic/basic-technique/two-jaw-surgery

(243) Liebregts J, Baan F, van Lierop P, de Koning M, Bergé S, Maal T, *et al.* One-year postoperative skeletal stability of 3D planned bimaxillary osteotomies: maxilla-first versus mandible-first surgery. Sci Rep. 2019;9(1): 3000. https://doi.org/10.1038/s41598-019-39250-x

(244) Axioquick. Arc facial dentaire avec fourchette occlusale by SAM Präzisionstechnik. MedicalExpo. https://www.medicalexpo.fr/prod/sam-praezisionstechnik/product-73906-663041.html

(245) Elite - Arc facial dentaire by Bio-Art Equipamentos Odontológicos. MedicalExpo. https://www.medicalexpo.fr/prod/bio-art-equipamentos-odontologicos/product-71548-565893.html

(246) Stade EH, Hanson JG, Baker CL. Esthetic considerations in the use of face-bows. J Prosthet Dent. 1982;48(3): 253-6. https://doi.org/10.1016/0022-3913(82)90004-X

(247) Barbenel JC, Paul PE, Khambay BS, Walker FS, Moos KF, Ayoub AF. Errors in orthognathic surgery planning: the effect of inaccurate study model orientation. Int J Oral Maxillofac Surg. 2010;39(11): 1103-8. https://doi.org/10.1016/j.ijom.2010.07.004

(248) Ellis E, Tharanon W, Gambrell K. Accuracy of face-bow transfer: effect on surgical prediction and postsurgical result. J Oral Maxillofac Surg Off J Am Assoc Oral Maxillofac Surg. 1992;50(6): 562-7. https://doi.org/10.1016/0278-2391(92)90434-2

(249) Gold BR, Setchell DJ. An investigation of the reproducibility of face-bow transfers. J Oral Rehabil. 1983;10(6): 495-503. https://doi.org/10.1111/j.1365-2842.1983.tb01473.x

(250) Bowley JF, Michaels GC, Lai TW, Lin PP. Reliability of a facebow transfer procedure. J Prosthet Dent. 1992;67(4): 491-8. https://doi.org/10.1016/0022-3913(92)90079-P

(251) Bamber MA, Firouzai R, Harris M, Linney A. A comparative study of two arbitrary face-bow transfer systems for orthognathic surgery planning. Int J Oral Maxillofac Surg. 1996;25(5): 339-43. https://doi.org/10.1016/S0901-5027(06)80025-1

(252) Paul PE, Barbenel JC, Walker FS, Khambay BS, Moos KF, Ayoub AF. Evaluation of an improved orthognathic articulator system: 1. Accuracy of cast orientation. Int J Oral Maxillofac Surg. 2012;41(2): 150-4. https://doi.org/10.1016/j.ijom.2011.09.019

(253) Paul PE, Barbenel JC, Walker FS, Khambay BS, Moos KF, Ayoub AF. Evaluation of an improved orthognathic articulator system. 2. Accuracy of occlusal wafers. Int J Oral Maxillofac Surg. 2012;41(2): 155-9. https://doi.org/10.1016/j.ijom.2011.09.020

(254) Shetty S, Shenoy KK, Sabu A. Evaluation of accuracy of transfer of the maxillary occlusal cant of two articulators using two facebow/semi-adjustable articulator systems: An *in vivo* study. J Indian Prosthodont Soc. 2016;16(3): 248-52. https://doi.org/10.4103/0972-4052.176525

(255) Gateno J, Forrest KK, Camp B. A comparison of 3 methods of face-bow transfer recording: implications for orthognathic surgery. J Oral Maxillofac Surg. 2001;59(6): 635-40; 640-41. https://doi.org/10.1053/joms.2001.23374

(256) O'Malley AM, Milosevic A. Comparison of three facebow/semi-adjustable articulator systems for planning orthognathic surgery. Br J Oral Maxillo-fac Surg. 2000;38(3): 185-90. https://doi.org/10.1054/bjom.1999.0182

(257) Zizelmann C, Hammer B, Gellrich NC, Schwestka-Polly R, Rana M, Bucher P. An evaluation of face-bow transfer for the planning of orthognathic surgery. J Oral Maxillofac Surg. 2012;70(8): 1944-50. https://doi.org/10.1016/j.joms.2011.08.025

(258) Sharifi A, Jones R, Ayoub A, Moos K, Walker F, Khambay B, *et al.* How accurate is model planning for orthognathic surgery? Int J Oral Maxillofac Surg. 2008;37(12): 1089-93. https://doi.org/10.1016/j.ijom.2008.06.011

(259) McMillen LB. Border movements of the human mandible. J Prosthet Dent. 1972;27(5): 524-32. https://doi.org/10.1016/0022-3913(72)90265-X

(260) Lotzmann U. Considerations of precision and consistance of mandibular transverse hinge axis. ZWR. 1990;99(5): 372-9.

(261) Ellis E. Accuracy of model surgery: Evaluation of an old technique and introduction of a new one. J Oral Maxillofac Surg. 1990;48(11): 1161-7. https://doi.org/10.1016/0278-2391(90)90532-7

(262) Song KG, Baek SH. Comparison of the accuracy of the three-dimensional virtual method and the conventional manual method for model surgery and intermediate wafer fabrication. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2009;107(1): 13-21. https://doi.org/10.1016/j.tripleo.2008.06.002

(263) Bamber MA, Harris M, Nacher C. A validation of two orthognathic model surgery techniques. J Orthod. 2001;28(2): 135-42. https://doi.org/10.1093/ortho/28.2.135

(264) Kwon TG, Mori Y, Minami K, Lee SH. Reproducibility of maxillary positioning in Le Fort I osteotomy: A 3-dimensional evaluation. J Oral Maxillofac Surg. 2002;60(3): 287-93. https://doi.org/10.1053/joms.2002.30583

(265) Lauren M, McIntyre F. A new computer-assisted method for design and fabrication of occlusal splints. Am J Orthod Dentofac Orthop. 2008;133(Suppl 4): S130-135. https://doi.org/10.1016/j.ajodo.2007.11.018

(266) Metzger MC, Hohlweg-Majert B, Schwarz U, Teschner M, Hammer B, Schmelzeisen R. Manufacturing splints for orthognathic surgery using a three-dimensional printer. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2008;105(2): e1-7. https://doi.org/10.1016/j.tripleo.2007.07.040

(267) Choi JY, Song KG, Baek SH. Virtual model surgery and wafer fabrication for orthognathic surgery. Int J Oral Maxillofac Surg. 2009;38(12): 1306-10. https://doi.org/10.1016/j.ijom.2009.06.009

(268) Choi JY, Hwang JM, Baek SH. Virtual model surgery and wafer fabrication using 2-dimensional cephalograms, 3-dimensional virtual dental models, and stereolithographic technology. Oral Surg Oral Med Oral Pathol Oral Radiol. 2012;113(2): 193-200. https://doi.org/10.1016/j.tripleo.2011.02.003

(269) Uribe F, Janakiraman N, Shafer D, Nanda R. Three-dimensional cone-beam computed tomography-based virtual treatment planning and fabrication of a surgical splint for asymmetric patients: surgery first approach. Am J Orthod Dentofac Orthop. 2013;144(5): 748-58. https://doi.org/10.1016/j.ajodo.2012.10.029

(270) Scolozzi P, Herzog G. Total mandibular subapical osteotomy and Le Fort I osteotomy using piezosurgery and computer-aided designed and manufactured surgical splints: a favorable combination of three techniques in the management of severe mouth asymmetry in Parry-Romberg syndrome. J Oral Maxillofac Surg. 2014;72(5): 991-9. https://doi.org/10.1016/j.joms.2013.09.044

(271) Vale F, Scherzberg J, Cavaleiro J, Sanz D, Caramelo F, Maló L, *et al.* 3D virtual planning in orthognathic surgery and CAD/CAM surgical splints generation in one patient with craniofacial microsomia: a case report. Dent Press J Orthod. 2016;21(1): 89-100. https://doi.org/10.1590/2177-6709.21.1.089-100.oar

(272) Ying B, Ye N, Jiang Y, Liu Y, Hu J, Zhu S. Correction of facial asymmetry associated with vertical maxillary excess and mandibular prognathism by combined orthognathic surgery and guiding templates and splints fabricated by rapid prototyping technique. Int J Oral Maxillofac Surg. 2015;44(11): 1330-6. https://doi.org/10.1016/j.ijom.2015.05.012

(273) Dahan S, Le Gall M, Julié D, Salvadori A. New protocols for the manufacture of surgical splints in surgical-orthodontic treatment. Int Orthod. 2011;9(1): 42-62. https://doi.org/10.1016/j.ortho.2010.12.009

(274) Lo LJ, Niu LS, Liao CH, Lin HH. A novel CAD/CAM composite occlusal splint for intraoperative verification in single-splint two-jaw orthognathic surgery. Biomed J. 2021;44(3): 353-62. https://doi.org/10.1016/j.bj.2020.03.004

(275) Aboul-Hosn Centenero S, Hernández-Alfaro F. 3D planning in orthognathic surgery: CAD/-CAM surgical splints and prediction of the soft and hard tissues results – Our experience in 16 cases. J Cranio-Maxillofac Surg. 2012;40(2): 162-8. https://doi.org/10.1016/j.jcms.2011.03.014

(276) Shqaidef A, Ayoub AF, Khambay BS. How accurate are rapid prototyped (RP) final orthognathic surgical wafers? A pilot study. Br J Oral Maxillofac Surg. 2014;52(7): 609-14. https://doi.org/10.1016/j.bjoms.2014.04.010

(277) Hernández-Alfaro F, Guijarro-Martínez R. New protocol for three-dimensional surgical planning and CAD/CAM splint generation in orthognathic surgery: an *in vitro* and *in vivo* study. Int J Oral Maxillofac Surg. 2013;42(12): 1547-56. https://doi.org/10.1016/j.ijom.2013.03.025

(278) Schouman T, Rouch P, Imholz B, Fasel J, Courvoisier D, Scolozzi P. Accuracy evaluation of CAD/CAM generated splints in orthognathic surgery: a cadaveric study. Head Face Med. 2015;11(1): 24. https://doi.org/10.1186/s13005-015-0082-9

(279) Zhou Y, Xu R, Ye N, Long H, Yang X, Lai W. The accuracy of computer-aided simulation system protocol for positioning the maxilla with a intermediate splint in orthognathic surgery. Int J Oral Maxillofac Surg. 2015;44: e316-7. https://doi.org/10.1016/j.ijom.2015.08.413

(280) Hanafy M, Abou-Elfetouh A, Mounir RM. Quality of life after different approaches of orthognathic surgery: a randomized controlled study. Minerva Stomatol. 2019;68(3): 112-7. https://doi.org/10.23736/S0026-4970.19.04227-4

(281) Kwon TG, Choi JW, Kyung HM, Park HS. Accuracy of maxillary repositioning in two-jaw surgery with conventional articulator model surgery versus virtual model surgery. Int J Oral Maxillofac Surg. 2014;43(6): 732-8. https://doi.org/10.1016/j.ijom.2013.11.009

(282) Ritto FG, Schmitt ARM, Pimentel T, Canellas JV, Medeiros PJ. Comparison of the accuracy of maxillary position between conventional model surgery and virtual surgical planning. Int J Oral Maxillofac Surg. 2018;47(2): 160-6. https://doi.org/10.1016/j.ijom.2017.08.012

(283) Lin X, Li B, Wang X, Shen SGF. Accuracy of maxillary repositioning by computer-aided orthognathic surgery in patients with normal temporomandibular joints. Br J Oral Maxillofac Surg. 2017;55(5): 504-9. https://doi.org/10.1016/j.bjoms.2017.02.018

(284) Solaberrieta E, Mínguez R, Barrenetxea L, Otegi JR, Szentpétery A. Comparison of the accuracy of a 3-dimensional virtual method and the conventional method for transferring the maxillary cast to a virtual articulator. J Prosthet Dent. 2015;113(3): 191-7. https://doi.org/10.1016/j.prosdent.2014.04.029

(285) Yamaguchi Y, Yamauchi K, Suzuki H, Saito S, Nogami S, Takahashi T. The accuracy of maxillary position using a computer-aided design/computer-aided manufacturing intermediate splint derived via surgical simulation in bimaxillary orthognathic surgery. J Craniofac Surg. 2020;31(4): 976-9. https://doi.org/10.1097/SCS.0000000000006305

(286) Kwon TG, Miloro M, Han MD. How accurate is 3-dimensional computer-assisted planning for segmental maxillary surgery? J Oral Maxillofac Surg. 2020;78(9): 1597-608. https://doi.org/10.1016/j.joms.2020.04.030

(287) Wang Y, Li J, Xu Y, Huang N, Shi B, Li J. Accuracy of virtual surgical planning-assisted management for maxillary hypoplasia in adult patients with cleft lip and palate. J Plast Reconstr Aesthetic Surg. 2020;73(1): 134-40. https://doi.org/10.1016/j.bjps.2019.07.003

(288) Kim BC, Lee CE, Park W, Kim MK, Zhengguo P, Yu HS, *et al.* Clinical experiences of digital model surgery and the rapid-prototyped wafer for maxillary orthognathic surgery. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2011;111(3): 278-285. https://doi.org/10.1016/j.tripleo.2010.04.038

(289) McCormick SU, Drew SJ. Virtual model surgery for efficient planning and surgical performance. J Oral Maxillofac Surg. 2011;69(3): 638-44. https://doi.org/10.1016/j.joms.2010.10.047

(290) Gaber RM, Shaheen E, Falter B, Araya S, Politis C, Swennen GRJ, *et al.* A systematic review to uncover a universal protocol for accuracy assessment of 3-dimensional virtually planned orthognathic surgery. J Oral Maxillofac Surg. 2017;75(11): 2430-40. https://doi.org/10.1016/j.joms.2017.05.025

(291) Stokbro K, Aagaard E, Torkov P, Bell RB, Thygesen T. Virtual planning in orthognathic surgery. Int J Oral Maxillofac Surg. 2014;43(8): 957-65. https://doi.org/10.1016/j.ijom.2014.03.011

(292) Chen X, Li X, Xu L, Sun Y, Politis C, Egger J. Development of a computer-aided design software for dental splint in orthognathic surgery. Sci Rep. 2016;6: 38867. https://doi.org/10.1038/srep38867

(293) Adolphs N, Liu W, Keeve E, Hoffmeister B. RapidSplint: virtual splint generation for orthognathic surgery – results of a pilot series. Comput Aided Surg. 2014;19(1-3): 20-8. https://doi.org/10.3109/10929088.2014.887778

(294) Dot G, Schouman T, Dubois G, Rouch P, Gajny L. Fully automatic segmentation of craniomaxillofacial CT scans for computer-assisted orthognathic surgery planning using the nnU-Net framework. Eur Radiol. 2022;32(6): 3639-48. https://doi.org/10.1007/s00330-021-08455-y

(295) Terzic A, Schouman T, Scolozzi P. Accuracy of morphological simulation for orthognatic surgery. Assessment of a 3D image fusion software. Rev Stomatol Chir Maxillo-Faciale Chir Orale. 2013;114(4): 276-82. https://doi.org/10.1016/j.revsto.2013.06.007

(296) Tran NH, Tantidhnazet S, Raocharernporn S, Kiattavornchareon S, Pairuchvej V, Wongsirichat N. Accuracy of three-dimensional planning in surgery-first orthognathic surgery: Planning versus outcome. J Clin Med Res. 2018;10(5): 429-36. https://doi.org/10.14740/jocmr3372w

(297) Shaheen E, Sun Y, Jacobs R, Politis C. Three-dimensional printed final occlusal splint for orthognathic surgery: design and validation. Int J Oral Maxillofac Surg. 2017;46(1): 67-71. https://doi.org/10.1016/j.ijom.2016.10.002

(298) Shaheen E, Coopman R, Jacobs R, Politis C. Optimized 3D virtually planned intermediate splints for bimaxillary orthognathic surgery: A clinical validation study in 20 patients. J Cranio-Maxillofac Surg. 2018;46(9): 1441-7. https://doi.org/10.1016/j.jcms.2018.05.050

(299) Schneider D, Kämmerer PW, Hennig M, Schön G, Thiem DGE, Bschorer R. Customized virtual surgical planning in bimaxillary orthognathic surgery: a prospective randomized trial. Clin Oral Investig. 2019;23(7): 3115-22. https://doi.org/10.1007/s00784-018-2732-3

(300) Hu X, Ji P, Wang T, Wu X. Combined orthodontic and orthognathic treatment with 3D-printing technique offers a precise outcome: A case report of two years followup. Int J Surg Case Rep. 2021;84: 105934. https://doi.org/10.1016/j.ijscr.2021.105934

(301) Elnagar MH, Aronovich S, Kusnoto B. Digital Workflow for Combined Orthodontics and Orthognathic Surgery. Oral Maxillofac Surg Clin N Am. 2020;32(1): 1-14. https://doi.org/10.1016/j.coms.2019.08.004

(302) Xu R, Ye N, Zhu S, Shi B, Li J, Lai W. Comparison of the postoperative and follow-up accuracy of articulator model surgery and virtual surgical planning in skeletal class III patients. Br J Oral Maxillofac Surg. 2020;58(8): 933-9. https://doi.org/10.1016/j.bjoms.2020.04.032

(303) Bibb R, Eggbeer D. Rapid manufacture of custom-fitting surgical guides. Rapid Prototyping Journal. 2009;15(5): 346-54. https://doi.org/10.1108/13552540910993879

(304) Polley JW, Figueroa AA. Orthognathic positioning system: Intraoperative system to transfer virtual surgical plan to operating field during orthognathic surgery. J Oral Maxillofac Surg. 2013;71(5): 911-20. https://doi.org/10.1016/j.joms.2012.11.004

(305) Zhang N, Liu S, Hu Z, Hu J, Zhu S, Li Y. Accuracy of virtual surgical planning in two-jaw orthognathic surgery: comparison of planned and actual results. Oral Surg Oral Med Oral Pathol Oral Radiol. 2016;122(2): 143-51. https://doi.org/10.1016/j.oooo.2016.03.004

(306) Bai S, Bo B, Bi Y, Wang B, Zhao J, Liu Y, *et al.* CAD/CAM surface templates as an alternative to the intermediate wafer in orthognathic surgery. Oral Surg Oral Med Oral Pathol Oral Radiol Endod. 2010;110(5): e1-7. https://doi.org/10.1016/j.tripleo.2010.05.052

(307) Lee UL, Kwon JS, Choi YJ. Keyhole system: A computer-assisted designed and computer-assisted manufactured maxillomandibular complex repositioner in orthognathic surgery. J Oral Maxillofac Surg. 2015;73(10): 2024-9. https://doi.org/10.1016/j.joms.2015.03.026

(308) Zinser MJ, Mischkowski RA, Sailer HF, Zöller JE. Computer-assisted orthognathic surgery: feasibility study using multiple CAD/CAM surgical splints. Oral Surg Oral Med Oral Pathol Oral Radiol. 2012;113(5): 673-87. https://doi.org/10.1016/j.oooo.2011.11.009

(309) Zinser MJ, Sailer HF, Ritter L, Braumann B, Maegele M, Zöller JE. A paradigm shift in orthognathic surgery? A comparison of navigation, computer-aided designed/computer-aided manufactured splints, and "classic" intermaxillary splints to surgical transfer of virtual orthognathic planning. J Oral Maxillofac Surg. 2013;71(12): 2151.e1-21. https://doi.org/10.1016/j.joms.2013.07.007

(310) Inverted L osteotomy. Indications and techniques. Pocket Dentistry. https://pocketdentistry.com/inverted-l-osteotomy-indications-and-techniques/

(311) Olszewski R, Tranduy K, Reychler H. Innovative procedure for computer-assisted genioplasty: three-dimensional cephalometry, rapid-prototyping model and surgical splint. Int J Oral Maxillofac Surg. 2010;39(7): 721-4. https://doi.org/10.1016/j.ijom.2010.03.018

(312) Kang SH, Lee JW, Lim SH, Kim YH, Kim MK. Validation of mandibular genioplasty using a stereolithographic surgical guide: *In vitro* comparison with a manual measurement method based on preoperative surgical simulation. J Oral Maxillofac Surg. 2014;72(10): 2032-42. https://doi.org/10.1016/j.joms.2014.03.002

(313) Yamauchi K, Yamaguchi Y, Katoh H, Takahashi T. Tooth-bone CAD/CAM surgical guide for genioplasty. Br J Oral Maxillofac Surg. 2016;54(10): 1134-5. https://doi.org/10.1016/j.bjoms.2016.03.012

(314) Li B, Wang S, Wei H, Zeng F, Wang X. The use of patient-specific implants in genioplasty and its clinical accuracy: a preliminary study. Int J Oral Maxillofac Surg. 2020;49(4): 461-5. https://doi.org/10.1016/j.ijom.2019.06.017

(315) Wang L, Tian D, Sun X, Xiao Y, Chen L, Wu G. The precise repositioning instrument for genioplasty and a three-dimensional printing technique for treatment of complex facial asymmetry. Aesthetic Plast Surg. 2017;41(4): 919-29. https://doi.org/10.1007/s00266-017-0875-2

(316) Lim SH, Kim MK, Kang SH. Genioplasty using a simple CAD/CAM (computer-aided design and computer-aided manufacturing) surgical guide. Maxillofac Plast Reconstr Surg. 2015;37(1): 44. https://doi.org/10.1186/s40902-015-0044-y

(317) Qiao J, Fu X, Gui L, Girod S, Lee GK, Niu F, *et al.* Computer image-guided template for horizontal advancement genioplasty. J Craniofac Surg. 2016;27(8): 2004-8. https://doi.org/10.1097/SCS.0000000000003093

(318) Wang LD, Ma W, Fu S, Zhang CB, Cui QY, Peng CB, *et al.* Design and manufacture of dental-supported surgical guide for genioplasty. J Dent Sci. 2021;16(1): 417-23. https://doi.org/10.1016/j.jds.2020.07.017

(319) Li B, Wei H, Zeng F, Li J, Xia JJ, Wang X. Application of a novel three-dimensional printing genioplasty template system and its clinical validation: A control study. Sci Rep. 2017;7(1): 5431. https://doi.org/10.1038/s41598-017-05417-7

(320) Li B, Shen SG, Yu H, Li J, Xia JJ, Wang X. A new design of CAD/CAM surgical template system for two-piece narrowing genioplasty. Int J Oral Maxillofac Surg. 2016;45(5): 560-6. https://doi.org/10.1016/j.ijom.2015.10.013

(321) Li B, Zhang L, Sun H, Yuan J, Shen SGF, Wang X. A novel method of computer aided orthognathic surgery using individual CAD/CAM templates: a combination of osteotomy and repositioning guides. Br J Oral Maxillofac Surg. 2013;51(8): e239-44. https://doi.org/10.1016/j.bjoms.2013.03.007

(322) Lin HH, Chang HW, Lo LJ. Development of customized position-ing guides using computer-aided design and manufacturing technology for orthognathic surgery. Int J Comput Assist Radiol Surg. 2015;10(12): 2021-33. https://doi.org/10.1007/s11548-015-1223-0

(323) Shehab MF, Barakat AA, AbdElghany K, Mostafa Y, Baur DA. A novel design of a computer-generated splint for vertical repositioning of the maxilla after Le Fort I osteotomy. Oral Surg Oral Med Oral Pathol Oral Radiol. 2013;115(2): e16-25. https://doi.org/10.1016/j.oooo.2011.09.035

(324) Li B, Wei HP, Jiang TF, Shen SY, Shen GF, Wang XD. [Clinical application and accuracy of the genioplasty surgical templates system for osseous genioplasty]. Chin J Stomatol. 2016;51(11): 646-50. https://doi.org/10.3760/cma.j.issn.1002-0098.2016.11.002

(325) Philippe B. Accuracy of position of cutting and drilling guide for sagittal split guided surgery: a proof of concept study. Br J Oral Maxillofac Surg. 2020;58(8): 940-6. https://doi.org/10.1016/j.bjoms.2020.04.034

(326) Chen H, Bi R, Hu Z, Chen J, Jiang N, Wu G, *et al.* Comparison of three different types of splints and templates for maxilla repositioning in bimaxillary orthognathic surgery: a randomized controlled trial. Int J Oral Maxillofac Surg. 2021;50(5): 635-42. https://doi.org/10.1016/j.ijom.2020.09.023

(327) Bai S, Shang H, Liu Y, Zhao J, Zhao Y. Computer-aided design and computer-aided manufacturing locating guides accompanied with prebent titanium plates in orthognathic surgery. J Oral Maxillofac Surg. 2012;70(10): 2419-26. https://doi.org/10.1016/j.joms.2011.12.017

(328) Imai H, Fujita K, Yamashita Y, Yajima Y, Takasu H, Takeda A, *et al.* Accuracy of mandible-independent maxillary repositioning using pre-bent locking plates: a pilot study. Int J Oral Maxillofac Surg. 2020;49(7): 901-7. https://doi.org/10.1016/j.ijom.2019.11.013

(329) Suojanen J, Leikola J, Stoor P. The use of patient-specific implants in orthognathic surgery: A series of 32 maxillary osteotomy patients. J Cranio-Maxillofac Surg. 2016;44(12): 1913-6. https://doi.org/10.1016/j.jcms.2016.09.008

(330) Kraeima J, Jansma J, Schepers RH. Splintless surgery: does patient-specific CAD-CAM osteosynthesis improve accuracy of Le Fort I osteotomy? Br J Oral Maxillofac Surg. 2016;54(10): 1085-9. https://doi.org/10.1016/j.bjoms.2016.07.007

(331) Philippe B. Computer designed guides and miniplates in orthognathic surgery: accuracy, outcomes and complications. Int J Oral Maxillofac Surg. 2015;44: e123. https://doi.org/10.1016/j.ijom.2015.08.739

(332) Brunso J, Franco M, Constantinescu T, Barbier L, Santamaría JA, Alvarez J. Custom-machined miniplates and bone-supported guides for orthog-nathic surgery: A new surgical procedure. J Oral Maxillofac Surg. 2016;74(5): 1061.e1-e12. https://doi.org/10.1016/j.joms.2016.01.016

(333) Savoldelli C, Vandersteen C, Dassonville O, Santini J. Dental occlusal-surface-supported titanium guide to assist cutting and drilling in mandibular bilateral sagittal split osteotomy. J Stomatol Oral Maxillofac Surg. 2018;119(1): 75-8. https://doi.org/10.1016/j.jormas.2017.10.009

(334) Li B, Shen S, Jiang W, Li J, Jiang T, Xia JJ, *et al.* A new approach of splintless orthognathic surgery using a personalized orthognathic surgical guide system: A preliminary study. Int J Oral Maxillofac Surg. 2017;46(10): 1298-305. https://doi.org/10.1016/j.ijom.2017.03.025

(335) Gander T, Bredell M, Eliades T, Rücker M, Essig H. Splintless orthognathic surgery: A novel technique using patient-specific implants (PSI). J Cranio-Maxillofac Surg. 2015;43(3): 319-22. https://doi.org/10.1016/j.jcms.2014.12.003

(336) Personalized treatment is the key to improving patient care. Materialise Medical. https://www.materialise.com/fr/blog/personalized-treatment-girft-initiative

(337) Implants crânio-maxillo-faciaux spécifiques au patient. Materialise Medical. https://www.materialise.com/fr/medical/implants-specifiques-aux-patients/implants-cmf

(338) Lutz JC, Schouman T, Meyer C, Savoldelli C, Louvrier A. Chin wing osteotomy using customised guide and implants: an improvement for a safer and swifter procedure: technical note. Br J Oral Maxillofac Surg. 2021;59(1): 129-31. https://doi.org/10.1016/j.bjoms.2020.08.060

(339) Arcas A, Vendrell G, Cuesta F, Bermejo L. Advantages of performing mentoplasties with customized guides and plates generated with 3D planning and printing. Results from a series of 23 cases. J Cranio-Maxillofac Surg. 2018;46(12): 2088-95. https://doi.org/10.1016/j.jcms.2018.09.018

(340) Patient-specific Cranio-Maxillofacial (CMF) implants. Materialise Medical. https://www.youtube.com/watch?v=ZY5g0LfvFjg

(341) Schouman T, Khonsari RH, Goudot P. Shaping the fibula without fumbling: the SynpliciTi customised guide-plate. Br J Oral Maxillofac Surg. 2015;53(5): 472-3. https://doi.org/10.1016/j.bjoms.2015.02.008

(342) Schouman T, Murcier G, Goudot P. The key to accuracy of zygoma repositioning: Suitability of the SynpliciTi customized guide-plates. J Cranio-Maxillofac Surg. 2015;43(10): 1942-7. https://doi.org/10.1016/j.jcms.2014.12.014

(343) Phillips C, Medland WH, Fields HW, Proffit WR, White RP. Stability of surgical maxillary expansion. Int J Adult Orthodon Orthognath Surg. 1992;7(3): 139-46.

(344) Yao W, Bekmezian S, Hardy D, Kushner HW, Miller AJ, Huang JC, *et al.* Cone-beam computed tomographic comparison of surgically assisted rapid palatal expansion and multipiece Le Fort I osteotomy. J Oral Maxillofac Surg. 2015;73(3): 499-508. https://doi.org/10.1016/j.joms.2014.08.024

(345) Kim H, Cha KS. Evaluation of the stability of maxillary expansion using cone-beam computed tomography after segmental Le Fort I osteotomy in adult patients with skeletal Class III malocclusion. Korean J Orthod. 2018;48(1): 63-70. https://doi.org/10.4041/kjod.2018.48.1.63

(346) Kretschmer WB, Baciut G, Baciut M, Zoder W, Wangerin K. Transverse stability of 3-piece Le Fort I osteotomies. J Oral Maxillofac Surg. 2011;69(3): 861-9. https://doi.org/10.1016/j.joms.2010.05.024

(347) Goldenberg DC, Alonso N, Goldenberg FC, Gebrin ES, Amaral TS, Scanavini MA, *et al.* Using computed tomography to evaluate maxillary changes after surgically assisted rapid palatal expansion. J Craniofac Surg. 2007;18(2): 302-11. https://doi.org/10.1097/scs.0b013e3180336012

(348) Marchetti C, Pironi M, Bianchi A, Musci A. Surgically assisted rapid palatal expansion vs. segmental Le Fort I osteotomy: transverse stability over a 2-year period. J Cranio-Maxillofac Surg. 2009;37(2): 74-8. https://doi.org/10.1016/j.jcms.2008.08.006

(349) Proffit WR, Turvey TA, Phillips C. Orthognathic surgery: a hierarchy of stability. Int J Adult Orthodon Orthognath Surg. 1996;11(3): 191-204.

(350) Ismail M, Wessel J, Farrell B. Maintenance of segmental maxillary expansion: The use of custom, virtually designed, and manufactured palatal appliances without the use of an occlusal splint. J Oral Maxillofac Surg. 2019;77(7): 1468.e1-1468.e8. https://doi.org/10.1016/j.joms.2019.03.013

(351) Parizotto JOL, Borsato KT, Peixoto AP, Bianchi J, Cassano DS, Gonçalves JR. Can palatal splint improve stability of segmental Le Fort I osteotomies? Orthod Craniofac Res. 2020;23(4): 486-92. https://doi.org/10.1111/ocr.12399

(352) Seemann J, Kundt G, Stahl de Castrillon F. Relationship between occlusal findings and orofacial myofunctional status in primary and mixed dentition: part IV: interrelation between space conditions and orofacial dysfunctions. J Orofac Orthop Fortschritte Kieferorthopadie. 2011;72(1): 21-32. https://doi.org/10.1007/s00056-010-0004-1

(353) Pancherz H. The nature of Class II relapse after Herbst appliance treatment: a cephalometric long-term investigation. Am J Orthod Dentofac Orthop. 1991;100(3): 220-33. https://doi.org/10.1016/0889-5406(91)70059-6

(354) Galli P. Stabilité des ostéotomies d'expansion maxillaire avec ostéosynthèse sur mesure et sans dispositif de rétention intra-orale [thèse de doctorat]. Aix-Marseille Université ; 2021. https://dumas.ccsd.cnrs.fr/dumas-03226334

(355) Figueiredo CE, Paranhos LR, da Silva RP, Herval ÁM, Blumenberg C, Zanetta-Barbosa D. Accuracy of orthognathic surgery with customized titanium plates-Systematic review. J Stomatol Oral Maxillofac Surg. 2021;122(1): 88-97. https://doi.org/10.1016/j.jormas.2020.06.011

(356) Scolozzi P. Computer-aided design and computer-aided modeling (CAD/CAM) generated surgical splints, cutting guides and custom-made implants: Which indications in orthognathic surgery? Rev Stomatol Chir Maxillo-Faciale Chir Orale. 2015;116(6): 343-9. https://doi.org/10.1016/j.revsto.2015.09.005

(357) Hanafy M, Akoush Y, Abou-ElFetouh A, Mounir RM. Precision of orthognathic digital plan transfer using patient-specific cutting guides and osteosynthesis versus mixed analogue-digitally planned surgery: a randomized controlled clinical trial. Int J Oral Maxillofac Surg. 2020;49(1): 62-8. https://doi.org/10.1016/j.ijom.2019.06.023

(358) Lutz JC, Assouline Vitale LS, Graillon N, Foletti JM, Schouman T. Standard and customized alloplastic facial implants refining orthognathic surgery: Outcome evaluation. J Oral Maxillofac Surg. 2020;78(10): 1832.e1-1832.e12. https://doi.org/10.1016/j.joms.2020.05.009

(359) MEDPOR. https://www.stryker.com/us/en/craniomaxillofacial/systems/medpor.html

(360) Shaber EP. Vertical interpositional augmentation genioplasty with porous polyethylene. Int J Oral Maxillofac Surg. 1987;16(6): 678-81. https://doi.org/10.1016/S0901-5027(87)80052-8

(361) Cenzi R, Guarda-Nardini L. Use of porous plyethylene (Medpor) in maxillofacial surgery. Minerva Stomatol. 1995;44(12): 559-82.

(362) Charrier JB, Moreau N. Micro-porous titanium implants in orthognathic facial recontouring. Orthod Fr. 2016;87(3): 295-300. https://doi.org/10.1051/orthodfr/2016027

(363) Stryker Tritanium Microsite. https://www.stryker.com/builttofuse/

(364) Mavili ME, Canter HI, Saglam-Aydinatay B, Kamaci S, Kocadereli I. Use of three-dimensional medical modeling methods for precise planning of orthognathic surgery. J Craniofac Surg. 2007;18(4): 740-7. https://doi.org/10.1097/scs.0b013e318069014f

(365) Lin HH, Lonic D, Lo LJ. 3D printing in orthognathic surgery – A literature review. J Formos Med Assoc Taiwan Yi Zhi. 2018;117(7): 547-58. https://doi.org/10.1016/j.jfma.2018.01.008

(366) Tarsitano A, Battaglia S, Crimi S, Ciocca L, Scotti R, Marchetti C. Is a computer-assisted design and computer-assisted manufacturing method for mandibular reconstruction economically viable? J Cranio-Maxillo-fac Surg. 2016;44(7): 795-9. https://doi.org/10.1016/j.jcms.2016.04.003

(367) Serrano C, Fontenay S, van den Brink H, Pineau J, Prognon P, Martelli N. Evaluation of 3D printing costs in surgery: a systematic review. Int J Technol Assess Health Care. 2020. https://doi.org/10.1017/s0266462320000331

(368) King BJ, Park EP, Christensen BJ, Danrad R. On-site 3-dimensional printing and preoperative adaptation decrease operative time for mandibular fracture repair. J Oral Maxillofac Surg. 2018;76(9): 1950.e1-1950.e8. https://doi.org/10.1016/j.joms.2018.05.009

(369) Resnick CM, Inverso G, Wrzosek M, Padwa BL, Kaban LB, Peacock ZS. Is there a difference in cost between standard and virtual surgical planning for orthognathic surgery? J Oral Maxillofac Surg. 2016;74(9): 1827-33. https://doi.org/10.1016/j.joms.2016.03.035

(370) Witowski JS, Pędziwiatr M, Major P, Budzyński A. Cost-effective, personalized, 3D-printed liver model for preoperative planning before laparoscopic liver hemihepatectomy for colorectal cancer metastases. Int J Comput Assist Radiol Surg. 2017;12(12): 2047-54. https://doi.org/10.1007/s11548-017-1527-3

(371) Scerrati A, Trovalusci F, Albanese A, Ponticelli GS, Tagliaferri V, Sturiale CL, *et al.* A workflow to generate physical 3D models of cerebral aneurysms applying open source freeware for CAD modeling and 3D printing. Interdiscip Neurosurg. 2019;17: 1-6. https://doi.org/10.1016/j.inat.2019.02.009

(372) Yang M, Li C, Li Y, Zhao Y, Wei X, Zhang G, *et al.* Application of 3D rapid prototyping technology in posterior corrective surgery for Lenke 1 adolescent idiopathic scoliosis patients. Medicine. 2015;94(8): e582. https://doi.org/10.1097/MD.0000000000000582

(373) Liu Y, Gao Q, Du S, Chen Z, Fu J, Chen B, *et al.* Fabrication of cerebral aneurysm simulator with a desktop 3D printer. Sci Rep. 2017;7(1): 44301. https://doi.org/10.1038/srep44301

(374) Rankin TM, Giovinco NA, Cucher DJ, Watts G, Hurwitz B, Armstrong DG. Three-dimensional printing surgical instruments: are we there yet? J Surg Res. 2014;189(2): 193-7. https://doi.org/10.1016/j.jss.2014.02.020

(375) Legocki AT, Duffy-Peter A, Scott AR. Benefits and limitations of entry-level 3-dimensional printing of maxillofacial skeletal models. JAMA Otolaryngol – Head Neck Surg. 2017;143(4): 389-94. https://doi.org/10.1001/jamaoto.2016.3673

(376) Li SS, Copeland-Halperin LR, Kaminsky AJ, Li J, Lodhi FK, Miraliakbari R. Computer-aided surgical simulation in head and neck reconstruction: A cost comparison among traditional, in-house, and commercial options. J Reconstr Microsurg. 2018;34(5): 341-7. https://doi.org/10.1055/s-0037-1621735

(377) Adolphs N, Liu W, Keeve E, Hoffmeister B. RapidSplint: virtual splint generation for orthognathic surgery – results of a pilot series. Comput Aided Surg. 2014;19(1-3): 20-8. https://doi.org/10.3109/10929088.2014.887778

(378) Lean manufacturing. Wikipedia. https://en.wikipedia.org/w/index.php?title=Lean_manufacturing

(379) Lean : qu'est-ce que le lean manufacturing ? Amalo Recrutement. https://www.amalo-recrutement.fr/blog/lean-manufacturing-definition-qu-est-ce-que-c-est/

(380) Allen T, Henn G. *The Organization and Architecture of Innovation: Managing the Flow of Technology*. Routledge ; 2006.

(381) Ballardini RM, Mimler M, Minssen T, Salmi M. 3D printing, intellectual property rights and medical emergencies: In search of new flexibilities. IIC - Int Rev Intellect Prop Compet Law. 2022;53(8): 1149-73. https://doi.org/10.1007/s40319-022-01235-1

(382) Esmond RW, Phero GC. The additive manufacturing revolution and the corresponding legal landscape. Virtual Phys Prototyp. 2015;10(1): 9-12. https://doi.org/10.1080/17452759.2014.972661

(383) Loi n° 2002-303 du 4 mars 2002 relative aux droits des malades et à la qualité du système de santé.

(384) Ralston W. They told their therapists everything. Hackers leaked it all. Wired. https://www.wired.com/story/vastaamo-psychotherapy-patients-hack-data-breach/

(385) Wang Y, Wang L, Xue CA. Medical information security in the era of artificial intelligence. Med Hypotheses. 2018;115: 58-60. https://doi.org/10.1016/j.mehy.2018.03.023

(386) CNIL. Loi Informatique et Libertés. https://www.cnil.fr/fr/la-loi-informatique-et-libertes

(387) Commission européenne, Medical Device Coordination Group. Document 2020-5. Clinical Evaluation – Equivalence. A guide for manufacturers and notified bodies. https://health.ec.europa.eu/system/files/2020-09/md_mdcg_2020_5_guidance_clinical_evaluation_equivalence_en_0.pdf

(388) ISO 13485: 2016. https://www.iso.org/cms/render/live/fr/sites/isoorg/contents/data/standard/05/97/59752.html

(389) Formlabs Customer Support. http://support.formlabs.com/

(390) Street M. Declaration of non-medical devices. https://media.formlabs.com/m/7255183b63f76d8c/original/1910271-CD-ENUS-0.pdf

(391) Biological reactivity tests, in vivo. http://www.pharmacopeia.cn/v29240/usp29nf24s0_c88.html

(392) RMeS (UMR Inserm U1229), https://www.oniris-nantes.fr/la-recherche/rmes-umr-inserm-u1229

(393) Logozzo S, Zanetti EM, Franceschini G, Kilpelä A, Mäkynen A. Recent advances in dental optics – Part I: 3D intraoral scanners for restorative dentistry. Opt Lasers Eng. 2014;54: 203-21. https://doi.org/10.1016/j.optlaseng.2013.07.017

(394) Mugnier J. Mise en application d'un flux numérique en chirurgie orthognathique à l'hôpital public [thèse d'exercice]. Université Claude Bernard – Lyon 1 ; 2021.

(395) Richert R, Goujat A, Venet L, Viguie G, Viennot S, Robinson P, *et al.* Intraoral scanner technologies: A Review to make a successful impression. J Healthc Eng. 2017;2017: 8427595. https://doi.org/10.1155/2017/8427595

(396) Banc d'essais 2019 7 scanners intra-oraux. Le fil dentaire. https://www.lefildentaire.com/articles/clinique/implantologie/banc-d-essais-2019-7-scanners-intra-oraux/

(397) PreForm 3D printing software: prepare your models for printing. Formlabs. https://formlabs.com/software/#preform

(398) IPS CaseDesigner tutorials. https://www.youtube.com/playlist?list=PL2gNMtPyFfQ5AYr5-9UJrEgjgKjkEOcbbx

(399) ISO 14937: 2009. https://www.iso.org/fr/standard/44954.html

(400) Ministère de l'emploi et de la solidarité, Ministère délégué à la santé – Direction de l'hospitalisation et de l'organisation des soins. Bonnes pratiques de pharmacie hospitalière ; 2001. http://www.omedit-centre.fr/Formationnouveauxarrivants_web_gen_web/res/BPPH.pdf

(401) Spaulding E. The role of chemical disinfection in the prevention of nosocomial infections. Dans : Proceedings of the International Conference on Nosocomial Infections; 1970. American Hospital Association; 1971. p. 247-54.

(402) ISO 11607-1: 2019. https://www.iso.org/fr/standard/70799.html

(403) ISO 11607-2: 2019. https://www.iso.org/fr/standard/70800.html

(404) Test de Bowie Dick. Wikipedia. https://fr.wikipedia.org/w/index.php?title=Test_de_Bowie_Dick&oldid=194554478

(405) Article L4121-1 du Code du travail. https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000035640828/

(406) Direction des études, Mission Santé-sécurité au travail dans les fonctions publiques (MSSTFP). La ventilation des locaux de travail.

(407) Article R4222-3 du Code du travail. https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000018532336

(408) Article R4222-6 du Code du travail. https://www.legifrance.gouv.fr/codes/article_lc/LEGIARTI000018532328

(409) Bastawrous S, Wu L, Strzelecki B, Levin DB, Li JS, Coburn J, *et al.* Establishing quality and safety in hospital-based 3D printing programs: Patient-first approach. Radiogr Rev Publ Radiol Soc N Am Inc. 2021;41(4): 1208-29. https://doi.org/10.1148/rg.2021200175

(410) ISO 14971: 2019. https://www.iso.org/fr/standard/72704.html

(411) Desroches A. Principe et pratique de l’APR (analyse préliminaire des risques). http://www.afgris.asso.univ-paris7.fr/congres2007/APR_A_DESROCHES.pdf

(412) Fonction et esthétique des maxillaires : implants dentaires. Global D https://www.globald.com/

(413) Chirurgie orthognathique. Solutions crânio-maxillo-faciales. Materialise. https://www.materialise.com/fr/medical/pds/cmf/chirurgie-orthognathique

(414) European Commission Medical Devices Regulation. https://ec.europa.eu/commission/presscorner/detail/en/SPEECH_22_7145