Digital Dentistry

Year 4 — Bachelor of Dental Surgery

Reference and Resource List — Chapters 13.1 to 13.11

Supporting the MCQ, SBA, SAQ and flashcard question bank

BM Education FZE

Disclaimer
Questions in this bank were generated with the assistance of artificial intelligence and reviewed against the references listed. They are provided for educational revision only, are not a substitute for prescribed textbooks, clinical guidelines or supervised clinical training, and no warranty is given as to their accuracy or completeness.

References are presented in Vancouver style. Part 1 lists the core sources that apply across the whole subject; Part 2 lists, for each chapter, the relevant sections of those core texts together with sources specific to that chapter. Numbers in square brackets in Part 2 refer to the core list in Part 1.

PART 1 — CORE REFERENCES (ALL CHAPTERS)

1.1 Principal digital dentistry and prosthodontic textbooks

1. Masri R, Driscoll CF, editors. Clinical Applications of Digital Dental Technology. Ames (IA): Wiley Blackwell; 2015.
2. Tamimi F, Hirayama H, editors. Digital Restorative Dentistry: A Guide to Materials, Equipment, and Clinical Procedures. Cham: Springer; 2019.
3. Wismeijer D, Chen S, Buser D, editors. ITI Treatment Guide. Vol. 11: Digital Workflows in Implant Dentistry. Berlin: Quintessence Publishing; 2019.
4. Rosenstiel SF, Land MF, Walter RD. Contemporary Fixed Prosthodontics. 6th ed. St Louis: Elsevier; 2023.
5. Shillingburg HT Jr, Sather DA, Wilson EL Jr, Cain JR, Mitchell DL, Blanco LJ, et al. Fundamentals of Fixed Prosthodontics. 4th ed. Chicago: Quintessence Publishing; 2012.

1.2 Supporting dental materials, orthodontics, implantology, occlusion and aesthetics

6. Sakaguchi RL, Ferracane JL, Powers JM, editors. Craig's Restorative Dental Materials. 14th ed. St Louis: Elsevier; 2019.
7. van Noort R, Barbour ME. Introduction to Dental Materials. 4th ed. Edinburgh: Mosby Elsevier; 2013.
8. Anusavice KJ, Shen C, Rawls HR, editors. Phillips' Science of Dental Materials. 12th ed. St Louis: Elsevier; 2013.
9. Resnik RR, editor. Misch's Contemporary Implant Dentistry. 4th ed. St Louis: Elsevier; 2020.
10. Proffit WR, Fields HW, Larson BE, Sarver DM. Contemporary Orthodontics. 6th ed. Philadelphia: Elsevier; 2019.
11. Okeson JP. Management of Temporomandibular Disorders and Occlusion. 8th ed. St Louis: Elsevier; 2020.
12. Dawson PE. Functional Occlusion: From TMJ to Smile Design. St Louis: Mosby Elsevier; 2007.
13. Fradeani M. Esthetic Rehabilitation in Fixed Prosthodontics. Vol. 1: Esthetic Analysis – A Systematic Approach to Prosthetic Treatment. Chicago: Quintessence Publishing; 2004.
14. Magne P, Belser U. Bonded Porcelain Restorations in the Anterior Dentition: A Biomimetic Approach. Chicago: Quintessence Publishing; 2002.
15. Whaites E, Drage N. Essentials of Dental Radiography and Radiology. 6th ed. Edinburgh: Elsevier; 2021.
16. Gibson I, Rosen D, Stucker B, Khorasani M. Additive Manufacturing Technologies. 3rd ed. Cham: Springer; 2021.
17. Ahmad I. Digital and Conventional Dental Photography: A Practical Clinical Manual. Chicago: Quintessence Publishing; 2004.
18. Bengel W. Mastering Digital Dental Photography. London: Quintessence Publishing; 2006.

1.3 Terminology and international standards

19. The Glossary of Prosthodontic Terms: Ninth Edition. J Prosthet Dent. 2017;117(5S):e1–e105.
20. International Organization for Standardization. ISO 5725-1:2023. Accuracy (trueness and precision) of measurement methods and results – Part 1: General principles and definitions. Geneva: ISO; 2023.
21. International Organization for Standardization. ISO 12836:2015. Dentistry – Digitizing devices for CAD/CAM systems for indirect dental restorations – Test methods for assessing accuracy. Geneva: ISO; 2015.
22. International Organization for Standardization. ISO 6872:2024. Dentistry – Ceramic materials. Geneva: ISO; 2024.
23. International Organization for Standardization. ISO/ASTM 52900:2021. Additive manufacturing – General principles – Fundamentals and vocabulary. Geneva: ISO; 2021.

24. International Organization for Standardization. ISO 10993-1:2018. Biological evaluation of medical devices – Part 1: Evaluation and testing within a risk management process. Geneva: ISO; 2018.
25. International Organization for Standardization. ISO 7405:2018. Dentistry – Evaluation of biocompatibility of medical devices used in dentistry. Geneva: ISO; 2018.
26. International Organization for Standardization. ISO 16443:2014. Dentistry – Vocabulary for dental implants systems and related procedure. Geneva: ISO; 2014.
27. International Organization for Standardization. ISO 9001:2015. Quality management systems – Requirements. Geneva: ISO; 2015.
28. International Organization for Standardization. ISO 13485:2016. Medical devices – Quality management systems – Requirements for regulatory purposes. Geneva: ISO; 2016.
29. National Electrical Manufacturers Association. Digital Imaging and Communications in Medicine (DICOM) Standard. Rosslyn (VA): NEMA. Available from: https://www.dicomstandard.org

1.4 Guidelines, regulatory and professional sources

30. General Dental Council. Standards for the dental team. London: GDC; 2013. Available from: https://www.gdc-uk.org
31. General Dental Council. Preparing for practice: dental team learning outcomes for registration. London: GDC; 2015. Available from: https://www.gdc-uk.org
32. European Parliament and Council of the European Union. Regulation (EU) 2016/679 of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data (General Data Protection Regulation). Off J Eur Union. 2016;L119:1–88.
33. Data Protection Act 2018 (c. 12). London: The Stationery Office; 2018. Available from: https://www.legislation.gov.uk/ukpga/2018/12
34. Information Commissioner's Office. Guide to the UK General Data Protection Regulation (UK GDPR). Wilmslow: ICO. Available from: https://ico.org.uk
35. Department of Health. Health Technical Memorandum 01-05: Decontamination in primary care dental practices. 2013 ed. London: Department of Health; 2013.
36. Health and Safety Executive. Control of substances hazardous to health (COSHH). Approved Code of Practice and guidance, L5. 6th ed. Norwich: HSE Books; 2013. Available from: https://www.hse.gov.uk
37. World Health Organization. Ethics and governance of artificial intelligence for health: WHO guidance. Geneva: WHO; 2021. Available from: https://www.who.int
38. World Health Organization. Regulatory considerations on artificial intelligence for health. Geneva: WHO; 2023. Available from: https://www.who.int
39. Dental Council of India. Bachelor of Dental Surgery (BDS) Course Regulations, 2007 (as amended). New Delhi: DCI.

1.5 Key journals for currency

Journal of Prosthetic Dentistry · International Journal of Computerized Dentistry · Dental Materials · Journal of Dentistry · Journal of Prosthodontics · International Journal of Prosthodontics · Clinical Oral Implants Research · American Journal of Orthodontics and Dentofacial Orthopedics · Journal of Esthetic and Restorative Dentistry · Journal of Dental Research · British Dental Journal

PART 2 — CHAPTER-SPECIFIC REFERENCES

Chapter 13.1 — Foundations of Digital Dentistry

13.1.1 Scope and objectives · 13.1.2 Core digital terminology · 13.1.3 Digital accuracy concepts

Core texts: [1] Introductory chapters on digital workflows · [2] Chapters on digital impressions and CAD/CAM principles · [7] · [19] · [20] · [21] · [29]

Additional

- Mangano F, Gandolfi A, Luongo G, Logozzo S. Intraoral scanners in dentistry: a review of the current literature. BMC Oral Health. 2017;17(1):149.
- Ender A, Mehl A. Full arch scans: conventional versus digital impressions – an in-vitro study. Int J Comput Dent. 2011;14(1):11–21.
- Ender A, Mehl A. Influence of scanning strategies on the accuracy of digital intraoral scanning systems. Int J Comput Dent. 2013;16(1):11–21.
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- Miyazaki T, Hotta Y. CAD/CAM systems available for the fabrication of crown and bridge restorations. Aust Dent J. 2011;56 Suppl 1:97–106.
- Joda T, Ferrari M, Gallucci GO, Wittneben JG, Brägger U. Digital technology in fixed implant prosthodontics. Periodontol 2000. 2017;73(1):178–92.
- Rekow ED. Digital dentistry: the new state of the art – is it disruptive or destructive? Dent Mater. 2020;36(1):9–24.

Chapter 13.2 — Intraoral Scanning (IOS): UG Core Skill

13.2.1 Indications for intraoral scanning · 13.2.2 Contraindications and challenging situations · 13.2.3 Scanner components and setup · 13.2.4 Scanning protocol · 13.2.5 Gingival displacement and digital impressions

Core texts: [1] Chapters on intraoral scanning · [2] Chapters on digital impression acquisition · [4] Chapters on tissue management and impressions · [5] · [21] · [35]

Additional

- Mangano F, Gandolfi A, Luongo G, Logozzo S. Intraoral scanners in dentistry: a review of the current literature. BMC Oral Health. 2017;17(1):149.
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- 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.
- Revilla-León M, Jiang P, Sadeghpour M, Piedra-Cascón W, Zandinejad A, Özcan M, et al. Intraoral digital scans – part 1: influence of ambient scanning light conditions on the accuracy (trueness and precision) of different intraoral scanners. J Prosthet Dent. 2020;124(3):372–8.

Chapter 13.3 — Digital Photography and Digital Records (Advanced UG Documentation)

13.3.1 Clinical photography basics (digital workflow integration) · 13.3.2 Digital patient records and data

Core texts: [17] · [18] · [30] · [32] · [33] · [34]

Additional

- Ahmad I. Digital dental photography. Part 1: an overview. Br Dent J. 2009;206(8):403–7.
- Ahmad I. Digital dental photography. Part 2: purposes and uses. Br Dent J. 2009;206(9):459–64.
- Ahmad I. Digital dental photography. Part 3: principles of digital photography. Br Dent J. 2009;206(10):517–23.
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- NHS England. Records management code of practice: a guide to the management of health and care records. London: NHS England; 2023. Available from: https://transform.england.nhs.uk

Chapter 13.4 — CAD/CAM Restorations (Chairside or Lab Workflow)

13.4.1 CAD/CAM indications · 13.4.2 CAD workflow basics · 13.4.3 CAM workflow basics · 13.4.4 CAD/CAM materials · 13.4.5 Adhesive cementation in digital restorations

Core texts: [1] Chapters on CAD/CAM restorations · [2] Chapters on materials and chairside workflows · [4] Chapters on all-ceramic restorations and luting · [5] · [6] · [7] · [8] · [22]

Additional

- Miyazaki T, Hotta Y, Kunii J, Kuriyama S, Tamaki Y. A review of dental CAD/CAM: current status and future perspectives from 20 years of experience. Dent Mater J. 2009;28(1):44–56.
- Mörmann WH. The evolution of the CEREC system. J Am Dent Assoc. 2006;137 Suppl:7S–13S.
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- Blatz MB, Conejo J. The current state of chairside digital dentistry and materials. Dent Clin North Am. 2019;63(2):175–97.
- Gracis S, Thompson VP, Ferencz JL, Silva NRFA, Bonfante EA. A new classification system for all-ceramic and ceramic-like restorative materials. Int J Prosthodont. 2015;28(3):227–35.
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- Kelly JR, Benetti P. Ceramic materials in dentistry: historical evolution and current practice. Aust Dent J. 2011;56 Suppl 1:84–96.
- Guess PC, Schultheis S, Bonfante EA, Coelho PG, Ferencz JL, Silva NRFA. All-ceramic systems: laboratory and clinical performance. Dent Clin North Am. 2011;55(2):333–52.
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- Blatz MB, Sadan A, Kern M. Resin-ceramic bonding: a review of the literature. J Prosthet Dent. 2003;89(3):268–74.

Chapter 13.5 — Digital Implant Dentistry

13.5.1 Digital planning fundamentals · 13.5.2 Surgical guides (overview) · 13.5.3 Digital impressions for implants (intro)

Core texts: [1] Chapters on digital implant workflows · [3] · [9] Chapters on CBCT planning and guided surgery · [15] Chapters on cone beam CT · [26] · [29]

Additional

- Joda T, Ferrari M, Gallucci GO, Wittneben JG, Brägger U. Digital technology in fixed implant prosthodontics. Periodontol 2000. 2017;73(1):178–92.
- Tahmaseb A, Wismeijer D, Coucke W, Derksen W. Computer technology applications in surgical implant dentistry: a systematic review. Int J Oral Maxillofac Implants. 2014;29 Suppl:25–42.

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- Mangano FG, Hauschild U, Admakin O. Full in-office guided surgery with open selective tooth-supported templates: a prospective clinical study on 20 patients. Int J Environ Res Public Health. 2018;15(11):2361.
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Chapter 13.6 — Digital Orthodontics (Intro Block)

13.6.1–13.6.3 (combined): digital records and model analysis · virtual set-up and clear aligner staging · printed models and retainers

Core texts: [1] Chapters on digital orthodontics · [10] Chapters on diagnostic records and clear aligner therapy · [16] · [21]

Additional

- Fleming PS, Marinho V, Johal A. Orthodontic measurements on digital study models compared with plaster models: a systematic review. Orthod Craniofac Res. 2011;14(1):1–16.
- Aragón ML, Pontes LF, Bichara LM, Flores-Mir C, Normando D. Validity and reliability of intraoral scanners compared to conventional gypsum models measurements: a systematic review. Eur J Orthod. 2016;38(4):429–34.
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Chapter 13.7 — 3D Printing in Dentistry (UG Practical Awareness)

13.7.1 Printing technologies · 13.7.2 Indications · 13.7.3 Post-processing and safety

Core texts: [1] Chapters on additive manufacturing · [2] Chapters on 3D printing materials · [16] · [23] · [24] · [25] · [36]

Additional

- Dawood A, Marti Marti B, Sauret-Jackson V, Darwood A. 3D printing in dentistry. Br Dent J. 2015;219(11):521–9.
- Revilla-León M, Özcan M. Additive manufacturing technologies used for processing polymers: current status and potential application in prosthetic dentistry. J Prosthodont. 2019;28(2):146–58.
- Alharbi N, Osman RB, Wismeijer D. Effects of build direction on the mechanical properties of 3D-printed complete coverage interim dental restorations. J Prosthet Dent. 2016;115(6):760–7.
- Osman RB, Alharbi N, Wismeijer D. Build angle: does it influence the accuracy of 3D-printed dental restorations using digital light-processing technology? Int J Prosthodont. 2017;30(2):182–8.
- Unkovskiy A, Bui PHB, Schille C, Geis-Gerstorfer J, Huettig F, Spintzyk S. Objects build orientation, positioning, and curing influence dimensional accuracy and flexural properties of stereolithographically printed resin. Dent Mater. 2018;34(12):e324–33.
- Tahayeri A, Morgan M, Fugolin AP, Bompolaki D, Athirasala A, Pfeifer CS, et al. 3D printed versus conventionally cured provisional crown and bridge dental materials. Dent Mater. 2018;34(2):192–200.
- 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.

Chapter 13.8 — Digital Occlusal Analysis and Digital Articulation

13.8.1 Digital occlusal analysis concepts · 13.8.2 Digital articulation

Core texts: [1] Chapters on digital occlusion and virtual articulators · [4] Chapters on occlusal considerations and articulators · [11] · [12] · [19]

Additional

- Maness WL, Benjamin M, Podoloff R, Bobick A, Golden RF. Computerized occlusal analysis: a new technology. Quintessence Int. 1987;18(4):287–92.
- Kerstein RB. Combining technologies: a computerized occlusal analysis system synchronized with a computerized electromyography system. Cranio. 2004;22(2):96–109.
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- Qadeer S, Kerstein R, Kim RJ, Huh JB, Shin SW. Relationship between articulation paper mark size and percentage of force measured with computerized occlusal analysis. J Adv Prosthodont. 2012;4(1):7–12.
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- Joda T, Gallucci GO. The virtual patient in dental medicine. Clin Oral Implants Res. 2015;26(6):725–6.

Chapter 13.9 — Digital Smile Design (DSD) and Aesthetic Planning (Intro)

13.9.1 Smile analysis parameters (overview) · 13.9.2 Digital planning workflow

Core texts: [10] Chapters on smile aesthetics · [13] · [14] · [17]

Additional

- Coachman C, Calamita M. Digital smile design: a tool for treatment planning and communication in esthetic dentistry. Quintessence Dent Technol. 2012;35:103–11.
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- Rosenstiel SF, Ward DH, Rashid RG. Dentists' preferences of anterior tooth proportion – a web-based study. J Prosthodont. 2000;9(3):123–36.
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- Sarver DM. Principles of cosmetic dentistry in orthodontics: part 1. Shape and proportionality of anterior teeth. Am J Orthod Dentofacial Orthop. 2004;126(6):749–53.

Chapter 13.10 — Errors, Limitations, and Quality Assurance in Digital Dentistry

13.10.1 Common digital workflow errors · 13.10.2 Quality assurance

Core texts: [1] · [2] Chapters on troubleshooting digital workflows · [20] · [21] · [27] · [28]

Additional

- Ender A, Mehl A. Influence of scanning strategies on the accuracy of digital intraoral scanning systems. Int J Comput Dent. 2013;16(1):11–21.
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Chapter 13.11 — Ethics, Data Protection, and Artificial Intelligence

13.11.1 Consent for digital data (intraoral scans, CBCT, STL files) · 13.11.2 Introduction to AI in dentistry (diagnosis, planning, ethics)

Core texts: [30] · [32] · [33] · [34] · [37] · [38]

Additional

- Schwendicke F, Samek W, Krois J. Artificial intelligence in dentistry: chances and challenges. J Dent Res. 2020;99(7):769–74.
- Hung K, Montalvao C, Tanaka R, Kawai T, Bornstein MM. The use and performance of artificial intelligence applications in dental and maxillofacial radiology: a systematic review. Dentomaxillofac Radiol. 2020;49(1):20190107.
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- Topol EJ. Deep Medicine: How Artificial Intelligence Can Make Healthcare Human Again. New York: Basic Books; 2019.

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