DT04 Design and manufacture simple complete removable prostheses

OVERVIEW

This standard focuses on the design and manufacture of simple complete removable prostheses - polymeric dentures. The worker will be constructing a straightforward denture on a suitable articulator. The removable prosthesis may be immediate, duplicate or contain resilient liners. The worker needs to design, manufacture and modify a trial prosthesis; convert it to clinically acceptable materials and finish it.

The term client is used to mean the member of the oral health care team who has prescribed the custom-made prosthesis. Clients may be external to the organisation (such as other laboratories, dental practitioners, training schools) or internal (eg within a dental hospital). The patient is the individual for whom the custom-made prosthesis is being made.

Users of this standard will need to ensure that practice reflects up to date information and policies.

Version No 1

KNOWLEDGE AND UNDERSTANDING

You will need to know and understand:

1. the skeletal anatomy and physiology of the head and neck
2. the structure, function, and movement of the oro-facial musculature (including the tongue) and temporomandibular joint
3. disorders and diseases affecting the oral cavity (eg angular cheilitis and denture stomatitis candidiasis, erosive lichen planus and chronic aphthous ulceration and dry mouth)
4. tooth morphology and the form of the natural anterior and posterior teeth
5. the aetiology and classifications of malocclusions
6. the physiological and pathological changes associated with the ageing process and trauma (eg the changes in enamel, dentine and pulp that occur with age and how these affects tooth shape and colour, the effect of tooth loss on the supportive dental tissue, the processes and effect of ridge resorption)
7. the broader factors (sociological, behavioural, environmental and economic) that
contribute to oral health and illness
8. the emotional impact of tooth loss on patients
9. the role of removable prostheses in the restoration and maintenance of:
   1. tissue support
   2. aesthetics
   3. phonetics
   4. function of occlusion and the temporomandibular joint
10. the importance of restoring and maintaining the occlusal vertical dimension
11. the benefits and restrictions of immediate tooth replacement in the provision of removable prostheses
12. the benefits and restrictions of retaining root structures in the provision of removable prostheses
13. the use and need for transitional removable prostheses
14. the purpose and use of resilient liners and tissue conditioners
15. the design limitations of large anterior undercuts and pre-existing dental conditions
16. retention and stability
   1. the effect of skeletal form and ridge relationships upon the function, design and manufacture of complete and partial removable prostheses
   2. the effect of the residual ridge shape and contour on the retention and stability of removable prostheses
   3. the effect of saliva viscosity on the retention of removable prostheses
   4. the effect of the oro-facial musculature on the retention and stability of removable prostheses
   5. the effects of the use of passive and displacive impression techniques on the retention and stability of removable prostheses
   6. the principles and the clinical criteria for the use of the neutral zone impression technique
   7. the importance of the use of biometric guides during the stages in the manufacture of removable prostheses
   8. the role of the baseplate in the retention and stability of removable prostheses
   9. the role of bucco-lingual positioning of artificial posterior teeth in the stability of removable prostheses
  10. the role of the positioning of artificial anterior teeth on the stability of removable prostheses
  11. the importance of artificial posterior tooth form and mould on the stability of removable prostheses
  12. the role of the polished surfaces in the retention and stability of removable prostheses
  13. the importance of occlusal rims in establishing tooth position in the manufacture of removable prostheses
  14. the importance of establishing and maintaining the occlusal table on the stability of removable prostheses
  15. the role of compensating curves in minimising instability of removable prostheses
17. aesthetics and phonetics
   1. the importance of pre-extraction guides in the development of acceptable aesthetics in the manufacture of removable prostheses
   2. the various methods of determining anterior tooth form for the manufacture of removable prostheses
   3. the role of dentogenic concepts in the selection of artificial teeth for the manufacture of removable prostheses
4. the effect of the ageing process on natural tooth form and colour
5. the importance of posterior tooth form in the development of acceptable aesthetics for the manufacture of removable prostheses
6. the importance of tooth material selection on the maintenance of aesthetics of removable prostheses
7. aesthetic and phonetic considerations in the anteroposterior positioning of upper and lower artificial anterior teeth
8. the compromises sometimes necessary between aesthetics and function in the provision of removable prostheses
9. the role of anatomical contouring in improving the aesthetics of removable prostheses
10. the importance of base material selection on the appearance of removable prostheses
11. the effect of staining on the aesthetics of removable prostheses
12. the challenges presented by overdenture abutments when maintaining acceptable appearance in removable prostheses manufacture
13. the importance of baseplate design in the development of good phonetics

18. articulation
1. the selection of a suitable dental articulator for the type of removable prosthesis
2. the benefits and restrictions of the various types of dental articulator
3. the various methods of transferring clinical information to the dental articulator
4. the use and need for kinematic relators (facebows, earbows and pantograph tracings etc)
5. the importance of hinge axis for the partially dentate mouth or where paranormal function of the temporomandibular joint exists
6. the purpose of split mounting and re-articulation procedures
7. the need to make adjustments to the various components parts of dental articulators based on the type and form of the patients existing or intended anterior tooth arrangement and occlusion
8. the purpose of centric and eccentric wafers when making adjustments to dental articulators
9. the indications and contraindications of using eccentric wafers in the development of occlusal stability during the manufacture of removable prostheses

19. the classification and sub-classification of materials on the basis of chemical composition and internal structure

20. the mechanical, physical, thermal, chemical and biological properties of materials
1. the importance of the evaluation of materials prior to use in the oral cavity
2. the ideal properties of materials used in the manufacture of removable prostheses
3. comparison of the materials currently used in dentistry to the ideal properties
4. the effects of storage on the properties of the materials used in the manufacture of removable prostheses
5. the properties of materials during manipulation
6. the properties of materials during setting
7. the effects of processing on the properties of the materials used in the manufacture of removable prostheses

21. waxes used in the manufacture of removable prostheses
1. the requirements of wax pattern and base materials
2. the composition of dental waxes used in the manufacture of removable prostheses
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28. the purpose of personal protective equipment
29. the range of equipment used in the design and manufacture of simple complete removable prostheses; methods of using equipment and materials safely (including the use of chemicals and other hazardous substances); methods of storing different equipment and materials safely and securely; methods of cleaning and maintaining different types of equipment and the workers role in this
30. the reasons for maintaining records throughout the process and of clearly identifying the products during the manufacturing process
31. organisational procedures and requirements for the recording of information about incoming work, work in progress and work delivered to clients, and the purpose of this
32. quality audit systems: their purpose, nature and procedures; impact of the Medical Devices Directive on the recording of incoming work, the detailed design and manufacturing specification and the recording of materials and processes
33. principles of quality assurance (including effective recording and sampling); processes and procedures for quality assurance in the workers workplace
34. methods of setting and calibrating equipment and of testing that this is correct
35. the effects of modifying manufacturers products to meet laboratory requirements on the physical properties of products, on quality assured products and the legal implications (eg of inaccurate mixing, inadequate processing)
36. the requirements of the Medical Devices Directive in monitoring the progress of devices through the production process
37. legal requirements of the contract of employment, confidentiality and employers regulations
38. health and safety at work legislation and related procedures and liability; principles of, and how to apply, legislation and regulations (eg COSHH regulations, the Health and Safety at Work Act, Environmental Protection Act)
39. legal requirements relating to third party insurance
40. the competency range of other members of the oral healthcare team (and the wider health and social care team)
41. the regulatory functions of the General Dental Council
42. legal and ethical obligations of regulated members of the oral healthcare team
43. the need for lifelong learning and professional development and responsibilities in relation to this for regulated members of the oral healthcare team
44. the oral healthcare teams wider responsibility to the community as a whole

PERFORMANCE CRITERIA

You must be able to do the following:

1. effectively clean and disinfect the returned occlusal registration rim and baseplate and transfer registration information accurately to the cast
2. mount the cast on an appropriate articulator, articulate it correctly and consistently
with any available occlusal registration information and record the necessary information correctly

3. modify, position and attach the prescribed artificial teeth to the baseplate in a manner that produces:
   1. occlusion and articulation appropriate to the patient's recorded jaw relationship
   2. the required aesthetic appearance
   3. a prosthesis which maximises retention, stability and support
   4. maximum masticatory efficiency

4. shape and contour the supportive wax consistent with the patient's musculature and facial support

5. clearly and accurately identify trial removable prosthesis with the patients unique reference and date of production

6. effectively clean and disinfect the trial removable prosthesis, prepare and package it safely for despatch and return it to the client at the agreed time

7. effectively clean and disinfect the returned trial removable prosthesis and identify from the clients instructions any modifications which are required

8. check the returned trial prosthesis for loosening or movement of teeth which may have occurred during try-in and make any adjustments which are necessary

9. fit the returned trial prosthesis to the cast if it needs to be modified, articulate it if this is required and make the required modifications

10. repeat the processes of modifying the prosthesis and returning it to the client for a try-in until a satisfactory prosthesis is achieved.

11. evaluate the prescription, the cast, the design and the modified trial prosthesis and decide:
    1. whether to use a duplicate cast for processing the final prosthesis
    2. how the occlusal load should be distributed in the final prosthesis
    3. whether there is a need for spacers and whether these should be pre-formed or custom-made

12. place the agreed wax trial prosthesis onto the cast and accurately transfer the information on tooth position from the try-in onto the cast

13. select and prepare mould material which is appropriate to:
    1. the complexity of the prosthesis
    2. the preferences of the client

14. construct a mould of the appropriate size and shape for converting the wax trial prosthesis to polymeric material

15. eliminate wax from the mould and prepare the surfaces of the mould and the artificial teeth for the introduction of polymeric

16. add spacers to create the correct size of void for soft lining if this has been prescribed

17. select polymeric material to manufacture the trial prosthesis and any resilient liner of a type and colour which is compatible with:
    1. the other materials in the prosthesis
    2. the required strength of the finished prosthesis
    3. the aesthetic requirements of the finished prosthesis

18. prepare in the correct ratio the required quantity of polymeric material and introduce it into the mould in a way that is consistent with how the material will be processed

19. determine the need for and perform a trial closure when using conventional packing, making additional modifications to form the resilient lining until the final required prosthesis is produced

20. process the polymeric material for the correct length of time at the correct
21. release the processed removable prosthesis from the mould without causing damage to it and trim any excess material.

22. select methods, materials and equipment for trimming, finishing and polishing the final prosthesis that are appropriate to the type of prosthesis and the materials used in its manufacture.

23. fix casts using articulating plaster and reposition them on an articulator.

24. assess the articulated prosthesis, confirm that the occlusion is appropriate to the prescription and the patients natural dentition, and make any necessary adjustments to maintain the original vertical dimension of the occlusion.

25. trim:
   1. and polish the prosthesis to create smooth and polished non-fitting surfaces
   2. the fitting surfaces to remove any processing irregularities or sharp edges

26. evaluate the finished prosthesis for:
   1. its quality and freedom from defects
   2. functional effectiveness to the design
   3. fit to the cast
   4. compliance with the prescription

27. correctly identify the finished prosthesis with the patients unique reference and date of production.

28. effectively clean and disinfect the finished prosthesis, prepare and package it safely for despatch together with instructions for the patient and client.

29. make complete, accurate and up-to-date records relating to the identification, components and manufacture of the prosthesis and store the records in the correct location consistent with relevant legislation.

**ADDITIONAL INFORMATION**

This National Occupational Standard was developed by Skills for Health.

This standard links with the following dimension within the NHS Knowledge and Skills Framework (October 2004):

Dimension: HWB9 Equipment and devices to meet health and wellbeing needs