OH33 2012 Design and manufacture prostheses using precision attachments

OVERVIEW

This standard focuses on the design and manufacture of prostheses using precision attachments; dental devices which are custom-made to fit the patient's unique mouth shape and which replace one or more missing teeth and incorporate the use of a precision connector of two or more parts. One part of the attachment is connected to a root, tooth or an implant, the other part to an artificial prosthesis; this provides mechanical retention. Precision attachments can be used in place of clasp arms: to retain partial dentures with extra or intra-coronal attachments. In complete dentures they can be used on roots or implants carrying studs or bars.A partial or complete prosthesis using precision attachments should restore a natural dental appearance in colour, shape and size; fit and occlude in the patient's mouth comfortably, be retained firmly in place in the patient's mouth and should not attract a build-up of food debris. In order to manufacture a prosthesis which meets aesthetic, fit ,occlusal and functional requirements, the technician needs to have an accurate cast or a digital representation, an accurate record of the relationship between the patient's upper and lower jaw and a record of the patient's tooth shade.The term â€˜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 general dental practitioners) or internal (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 2

KNOWLEDGE AND UNDERSTANDING

You will need to know and understand:

1. the skeletal anatomy, physiology of the head and neck and tooth morphology
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
4. the aetiology and classifications of malocclusions
5. the physiological and pathological changes associated with the ageing process and trauma related to the oral environment
6. the effect of tooth loss on the supportive dental tissue, the processes and effect of ridge resorption
7. the importance of retention of the periodontal ligament and the changes in proprioception due to loss of periodontal ligament

8. the broader factors (sociological, behavioural, environmental and economic) that contribute to oral health and illness
9. articulation
10. aesthetics and phonetics
11. the principles of prostheses design
12. the classification and sub-classification of materials on the basis of chemical composition and internal structure
13. the mechanical, physical, thermal, chemical and biological properties of materials
14. cast and mould forming
15. waxes
16. dental alloys
17. principles of precision attachment work
18. methods of constructing dental bridges and crowns using precision attachments
19. techniques of joining components used in dental work
20. dental refractory materials
21. the relationship between chemical bonds and the properties of solid materials
22. impression, duplicating and cleaning materials
23. casting patterns
24. methods of sprueing various metals and systems
25. methods of surface finishing
26. the principles and use of digital design and manufacturing
27. methods of developing, maintaining and improving communication and information relating to the provision of custom-made dental devices
28. the importance of communicating with individuals at a pace, in a manner, and at a level appropriate to their understanding, needs and preferences, whilst maintaining their dignity and choice
29. methods of protection against contamination and infection control when handling received impressions and other items which may have been in the mouth, or which are intended to be placed in the mouth; why it is important to do so
30. the purpose of personal protective equipment
31. the range of equipment used in the design and manufacture of dental devices; 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 your role in this
32. the reasons for maintaining records throughout the process and of clearly identifying the products during the manufacturing process
33. 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
34. principles of quality assurance including effective recording and sampling; processes and procedures for quality assurance in your workplace
35. methods of setting and calibrating equipment and of testing that this is correct
36. the effects of modifying manufacturers' products to meet laboratory requirements on the physical properties of products and on quality assured products, and the legal implications of poor manufacturing
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 relating to the manufacturing of devices
39. the role and obligations of members of the dental team and the regulatory functions of the General Dental Council

PERFORMANCE CRITERIA

You must be able to do the following:

1. agree with clients:
    1. your role in the planning process
    2. the way in which the diagnosis and planning is to be carried out
2. produce a master cast/die from the impressions received from the client or by use of digital methods
3. appraise the casts/dies/digital representation for:
    1. position of the present dentition and related issues
    2. vertical dimension
    3. spaces to be filled
    4. clearance for attachments and determine the type of attachment to use for the patient concerned
4. provide advice to the client on an optimal design for the prosthesis including the following aspects:
    1. oral hygiene
    2. number of abutments
    3. angle and height of abutments
    4. length of free-end saddles
    5. vertical height
    6. ridge structure
    7. possible physical disability
    8. whether the attachment should be rigid or resilient
5. respond appropriately to questions and issues from the client relating to the design of the prosthesis and the treatment as it proceeds
6. evaluate casts/dies/digital representation against abutment requirements, eliminate any unnecessary undercuts and record and inform the client of any adjustments made
7. assess the occlusion using casts mounted on an articulator or by digital representation to:
    1. determine the necessary information for the manufacture of occlusal form
    2. determine if adequate clearance has been provided
8. survey the cast or digital representation to:
    1. establish the alignment of the long axes of the teeth
    2. establish undercut and non-undercut areas of the teeth
    3. find a path of insertion common to all abutment teeth
9. introduce attachments to produce a split design prosthesis in the event of a malalignment of teeth
10. introduce attachments into the design that are appropriate for the space to be filled and ensuring that there is sufficient space for wax contouring/digital forming and oral hygiene
11. position matrices/patrices with a parallelometer prior to placing into position or if using anchors and bars accurately measure and position items
12. convert the pattern using a process appropriate to the alloy and the item
13. retrieve the metallic sub-structure in a manner that maintains the integrity of the metal, place the parts on the cast and dies, check for fit and occlusal contact and make any adjustments that are required
14. If any of the parts require soldering or welding, assemble the metallic parts and confirm that components and frameworks are fixed:
    1. securely
    2. in the required position

3. using an appropriate material
4. in a manner that enables the optimum join to be made

15. accurately apply flux to those areas where solder is required and block out with anti-flux those where solder is not required so that there is no incursion of solder in investing, casting and trimming, or use a jig for accurate laser welding
16. accurately solder component parts
17. remove flux, anti-flux and excess solder once soldering is complete
18. in laser welding use appropriate directional and amounts of laser application
19. place the sub-structure on the cast after soldering/welding and confirm that:
    1. it fits the cast
    2. it complies with the prescription
    3. it will not damage surrounding tissues in the patient's mouth and make any necessary adjustments
20. once the framework is complete, disassemble and assemble the precision attachments with care ensuring that the parts are kept clearly separated and safe
21. compare the developing item throughout the process for its harmonisation with:
    1. the patient's natural tooth form
    2. tooth morphology
    3. all occlusal articulations
    4. effects of adjacent natural teeth and of restorations
    5. pontic coronal form
    6. profile of pontic in relation to aesthetics, self cleaning and residual ridge
    7. prosthetic form representing simulated gum tissue
    8. aesthetic requirements
    9. prescription requirements and make any necessary adjustments
22. check the item:
    1. for faults
    2. general fit and undertake any necessary rework
23. create appropriate textures on the different surfaces consistent with:
    1. the alloy
    2. the item's design
    3. the requirements of the prescription
24. finish the item so that it is:
    1. capable of maintaining accuracy of fit
    2. of the appropriate shape
25. verify the finished prosthesis:
    1. for good overall fit of work to die margins and cast parameters
    2. for occlusion and articulation
    3. for proximal contact areas
    4. for appropriate finish of surfaces
    5. against the prescription requirements
26. correctly identify the prosthesis with the patient's unique reference and date of production
27. effectively clean the finished prosthesis, prepare and package it safely for dispatch together with documentation for the patient and client
28. 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
29. provide Statement of Manufacture for the appliance as required under current regulation

ADDITIONAL INFORMATION

This National Occupational Standard was developed by Skills for Health. It replaces DT24.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