CROWNS, FIXED BRIDGES AND DENTAL IMPLANTS

GUIDELINES

THE BRITISH SOCIETY
FOR RESTORATIVE DENTISTRY

“WHY IS IT THAT TEETH DECAY? YOU DON’T ALWAYS HAVE TO GO TO THE DOCTOR’S TO HAVE HOLES IN YOUR ARM STOPPED UP DO YOU? IT’S A FLAW IN THE DESIGN.”

ALAN BENNETT

INTRODUCTION

Standards in healthcare are of fundamental importance. Evidence-based dentistry, audit and peer review are essential components of effective clinical practice.

To assist with these processes, the BSRD perceives a need for guidelines on acceptable levels of care in restorative dentistry. Some guidance is already available from our sister organisations, the British Endodontic Society, the British Society of Periodontology and The British Society of Prosthodontics, within their spheres of interest.

This document is intended to act as a stimulus to members of the Society and to the profession to seek attainable targets for quality in fixed prosthodontics. It is hoped that this document from the Society will assist in the pursuit and maintenance of high standards of clinical practice.

These guidelines should not be considered prescriptive or didactic. Obviously, there will be circumstances, encountered during patient management, when the “ideal” treatment may not be possible nor the outcome optimal.

In addition, new techniques and materials will become available which will bring about change. However, it is the Society’s belief that these standards can and should be the goal during management of the majority of clinical cases.

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INDICATIONS

The decision to provide a crown or fixed bridge whether tooth or implant - supported depends on many factors, including:

- The motivation and aspirations of the patient.
- The oral and general health of the patient.
- The condition of the remaining teeth and tooth tissues, the periodontal condition and oral hygiene maintenance.
- Analysis of the benefits, disadvantages and long-term consequences of providing a crown or fixed prosthesis.
- Complications which limit the likelihood of clinical success.
- The skill and experience of the clinician.

In all situations, the clinical advantages and long-term benefits of crowns and fixed bridges should justify such treatment and outweigh their disadvantages. They should only be undertaken in those situations in which such advanced restorative care will clearly contribute to the oral health and welfare of the patient.

The replacement of failed crowns and bridges and the teeth or implants which support them should be conditional on an understanding of the aetiology and successful preventive management of the cause(s) of failure.

ALTERNATIVES TO CROWNS AND FIXED PROSTHESES

Modern dentistry offers many opportunities to provide direct and indirect restorations which satisfy aesthetic and functional requirements of patients without the need for significant, if any, tooth preparation.

Vital bleaching, composite resins, ceramic inlays and onlays and resin-retained bridges frequently have major roles in any treatment plan.

Where teeth are minimally or moderately restored at the time of presentation, adhesive restorations are generally most appropriate.

For example, in the management of the worn dentition, particularly that damaged by erosive substances, the use of full coverage crowns has little to commend it as the first option for treatment.

Dental implants may frequently be the treatment of choice when missing teeth are to be replaced. The biological cost to the patient is low when sufficient bone is available to house them.

Aspects of the provision of implant-based restorative dentistry are similar to those for teeth whilst others require different considerations and skills. These guidelines will refer to implant-supported crowns and fixed prostheses as necessary.

The development of adhesive techniques and the predictability of dental implants reduce the need for the removal of sound tissue as part of restorative treatment.

DEFINITION OF A FIXED BRIDGE

Any dental prosthesis that is luted, screwed or mechanically attached or otherwise securely retained to natural teeth, tooth roots, and/or dental implant abutments that furnish the primary support for the dental prosthesis.

The Glossary of Prosthodontic Terms J Prosthet Dent 2005; 94: 10-92

THE RATIONALE FOR THE USE OF:

CROWNS:

- To restore the form, function and appearance of teeth which are badly broken down, worn or fractured to the extent that simpler forms of restorations are contraindicated or have been found to fail in clinical service.
- To improve the form and appearance of unsightly teeth which cannot be managed by more conservative cosmetic procedures.
- To reduce the risk of fractures occurring in extensively restored teeth including endodontically treated posterior teeth.
- More rarely, to alter significantly the shape, size and inclination of teeth for cosmetic and functional purposes.
- To restore a dental implant.

FIXED BRIDGES:

- To replace one or more teeth of functional or cosmetic importance to the patient.
- More rarely, to prevent tooth movement and improve occlusal stability.

Tooth-supported bridges require the availability of sufficient abutments of appropriate quality and prognosis. Either in the absence of adjacent suitable teeth or when they would not benefit from restoration, implant-supported prostheses should be considered. Dental implants offer the benefit of being able to facilitate tooth replacement without the need to involve teeth adjacent to the edentulous area. Where implant placement and restoration are complicated and the use of tooth-supported fixed bridgework is contra-indicated the use of removable partial prostheses will require evaluation by both the dentist and the patient.

AIMS

- To determine the patient's requirements and expectations and to gain an informed opinion of the patient's suitability for treatment involving the use of crowns or fixed prostheses.
- To obtain a history, which includes details of all previous conditions and experiences of relevance including information pertaining to any adverse reactions to treatment, the administration of drugs and the use of materials.
- A medical history is mandatory for all patients. Treatment involving the provision of dental implants should additionally include questioning regarding the following recognised risk factors:
- Osteoporosis.
- Bisphosphonate therapy.
- Uncontrolled diabetes.
- Smoking.
- Radiotherapy.

Patients with medical conditions may still be treated with implants following advice from their physician.

- To complete a comprehensive clinical examination which will include a review of the clinical performance and mode of failure of any existing restorations. This will require a diagnosis of existing disease and an assessment of the processes that have resulted in the need to provide restorations and prostheses.
- To analyse the effectiveness of the patient's control of their own dental disease.

The clinical examination may be supported by special tests, which may include:

- Sensibility testing of teeth.
- Radiographic examinations.
- Analyses of study casts mounted in a semi-adjustable articulator in an appropriate jaw relationship
- Assessments of the patient's response to initial instruction in oral hygiene procedures.

Other forms of special test may include:

- Dietary analyses.
- The use of diagnostic and provisional appliances.
- Direct observations of occlusal and masticatory function.
- Long-term monitoring against base-line study casts.

Diagnoses may take time to establish and require the use of additional special tests including dental investigations to stabilise or determine a prognosis for one or more teeth.

Any case considered to be beyond a clinician's capabilities and experience should be referred for further assessment, advice and possibly treatment.

Many clinical situations benefit from the involvement of additional dental specialists or those with particular skills. Such involvement should take place prior to the establishment of a treatment plan and may increase the options available to the patient. Implant-based treatment may be provided either by a single competent operator or by a team lead by a prosthodontist and including a surgeon.

The need for inter-disciplinary provision and restoration of implants is based on the complexity of the case and the skill and wishes of the dentist providing the restorative care. It is important that the whole dental team is knowledgeable about dental implants. Training of dental nurses, technicians and reception staff is mandatory.

ASSESSMENT

TREATMENT PLANNING

AIMS

- To establish the diagnoses, related clinical findings and treatment alternatives, together with the patient, and to determine the nature and most appropriate sequence of events, which should result in the successful achievement of agreed treatment objectives.
- To devise a realistic management strategy which should:
- Control and prevent further active disease.
- Be efficient and effective yet involving only minimal operative intervention.
- Satisfy the patient's expectations and requirements.
- Result in optimal outcomes and long-term benefits.
- Involve minimum psychological trauma.
- Facilitate any further treatment, which may be required.
- Take account of long-term maintenance
- To decide on the design and material(s) to be used in the construction of the crown or fixed bridge.

DESIGN

The design for tooth-supported fixed bridges should:

- Be as simple and conservative as possible, yet sufficient to satisfy physical and mechanical requirements.
- Avoid where possible using multiple, linked abutments.
- Consider the use of dental implants as an alternative to tooth-supported fixed prostheses.
- Enhance occlusal relationships and function, yet minimise adverse loading.
- Encourage optimal tissue response and facilitate effective oral hygiene maintenance. Particular attention needs to be paid to the maintenance of embrasure spaces to facilitate oral hygiene.
- Be realistic in terms of being attainable clinically with an acceptable prognosis.

The choice of material(s) should:

- Allow the realisation of patients' cosmetic expectations, but not necessitate preparations involving excessive removal of sound tooth tissue.
- Facilitate optimal tissue response.
- Take account of:
- The materials and tissues forming opposing and adjacent contacts.
- Technical considerations.
- Be limited to those which satisfy the relevant standards.

Implant-supported crowns and fixed bridges should use an implant system which:

- Is supported by a good evidence base.
- Has good company support for training, product availability and a guarantee of long-term supply.
- Fulfils national and international standards.
- Is made of appropriate material and has suitable shape and surface configuration.
- Provides a variety of implant lengths and diameters.
- Provides a variety of abutments.
- Has an internal connection for abutments.
- Has protocols to allow single stage surgery, two stage surgery, immediate placement, immediate loading, cemented or screw-retained restorations.
- Has a universal implant for all bone types.
- Allows ease of use with rationalised components.
- Has low start-up costs.
- Is affordable for the patient.

Treatment planning is facilitated by:

- Having demonstration models and illustrated case histories to discuss with patients.
- The use of study casts to rehearse preparations, and for the purposes of diagnostic wax-ups. The use of diagnostic wax-ups or "try-ins" for both tooth and implant-supported prostheses is highly beneficial in all cases and is nearly always essential for optimal treatment.
- Liaison with the technician who will construct the crown or prosthesis.
- Effective audit and peer review processes.

Before finally agreeing to a particular treatment strategy, patients should be made aware of the implications, possible sequelae and anticipated life-expectancy of the work and other options for their continuing care.

In addition, patients must understand and accept that the success of the treatment will be highly dependent on their subsequent commitment to oral health care maintenance. This constitutes an essential part of the process of obtaining informed consent from the patient prior to treatment.

All treatment plans should be kept under continual review throughout all stages of patient management. Contingency treatment options should form part of the overall strategy for patient care.

While not always essential, preoperative photographic records may assist in the provision of treatment and form part of a base-line record.

CONSENT

It is important to obtain written informed consent for all forms of fixed prosthodontic treatment: this should include a clear understanding of the financial cost of treatment. Consent may only be obtained following a full discussion of the proposed treatment with the patient.

CLINICAL RECORDS

In common with all other documentation related to the patient, clinical records detailing the provision of crowns and bridges should be complete, unambiguous and prepared in a legible form.

PREPARATORY MANAGEMENT

Preparatory management should, where indicated, include demonstrable completion of:

- Relief of pain, extraction of hopeless teeth, control of carious lesions and any necessary preliminary occlusal adjustment.
- Non-surgical periodontal therapy.
- Assessment of the patient's response to initial treatment.
- Investigation of individual teeth and the placement of cores.
- Definitive endodontic treatment.
- Assessment for dental implants if part of the treatment strategy. These require particular consideration to optimise the final prosthetic result.
- Any necessary orthodontic treatment.
- Any necessary surgical periodontal treatment
- Definitive occlusal adjustment or equilibration if required.
- Placement of dental implants if part of the treatment plan.

SPACE REQUIREMENTS FOR DENTAL IMPLANTS

- There should be adequate inter-dental and inter-occlusal space for an implant restoration.
- There should be sufficient space for the implant to be placed in the bone without compromising adjacent structures.
- Where implants are placed between teeth or adjacent to each other there should be sufficient space to allow normal soft tissue contours around them. Implants should be fully covered by the bone. Where there is insufficient bone augmentation procedures should be considered.
- Anatomical structures may prevent the simple placement of dental implants in the posterior maxilla and posterior mandible.
- Bone concavities or thin ridges may compromise implant placement.
- The effects of gross resorption following tooth extraction and the presence of flabby ridges make implant placement more difficult.
- Care must also be taken with implant placement if there is a large incisive canal or submandibular fossa.

THE NUMBER AND POSITION OF IMPLANTS

The number and position of implants is influenced by the type of prosthesis provided, the quantity and quality of bone and the occlusal loads expected. For edentulous patients the following may be a guide:

Fixed bridge

Maxilla – 6 implants

Mandible – 4 implants

Overdenture

Maxilla – 4 implants

Mandible – 2 implants

- The implants should be placed at regular intervals and correspond to the correct tooth positions.
- It is not necessary to use an implant for every missing tooth if long and stable implants can be placed.

SURGICAL PROTOCOLS FOR IMPLANT PLACEMENT

- The placement of dental implants is under constant development. The main aim of these developments is to reduce treatment times and improve patient care. It is important for the clinician to follow protocols produced by companies, or experienced teachers in the field of implantology.
- Drilling procedures should follow standard protocols. Initial stability is important for osseointegration to occur.
- A surgical guide (template or stent) is necessary for planning, surgical placement and the prosthodontic stages to help with design of the superstructure. The guide helps with the positioning, spacing and angulation of single or multiple implants in the surgical field.
- The surgical flap will be influenced by the extent of surgery, the anatomical structures and the experience of the operator. Larger flaps will be needed to identify the mental or inferior dental nerve and during sinus lift procedures.
- "Flapless" surgery involves perforation of the mucosa at the implant site only, followed by the bone osteotomy and subsequent implant placement. The morbidity is low and surgical time reduced. For this technique to be successful good bone volume needs to be present or careful placement carried out with a CAD-CAM produced surgical drilling guide based on a CT scan.
- Preservation of the gingivae or attached mucosa is important for the final functional and aesthetic result. Soft tissue surgery, possibly involving free or pedicle grafts, may facilitate the prosthodontic stages.

SINGLE VERSUS TWO-STAGE SURGERY

There is no evidence of improved outcomes between single and two stage surgical treatments. Single stage surgery is convenient for patients and reduces treatment times. A two-stage procedure, whereby the implant is buried and subsequently uncovered after an appropriate healing time should be considered under the following circumstances:

- Where the temporary prosthesis is a denture.
- Where bone augmentation has been carried out.
- Where there is poor initial stability of the dental implant.

IMMEDIATE PLACEMENT

In this type of treatment the dental implant is placed immediately into the tooth socket following dental extraction.

- The bone should be healthy with no evidence of peri-radicular infection or pathology.
- It is helpful if there is at least 5mm of apical bone to the tooth socket to allow for good (primary) implant stability on placement.
- This technique is more difficult for multi-rooted teeth.

IMMEDIATE LOADING

- The temporary crown or prosthesis is attached to the implant immediately after surgical placement of the implant.
- It can be employed for a single tooth, multiple tooth spans or a full arch.
- It is important that good primary stability of the dental implant stability is achieved.
- Occlusal loading must be controlled.
- This treatment can be successful in the anterior mandible.
- Longer spans or full arch restorations require multiple stable implants.

HEALING TIMES

Healing times refer to the time that the implant needs to osseointegrate in the jawbone.

- With developments in implant design and surface configuration these are under constant review.
- A safe healing time in the mandible would be two to three months and three to four months in the maxilla.
- If there are complications with implant treatment it is recommended that the healing times should be lengthened to allow a better chance of osseointegration.

CEMENTED OR SCREW-RETAINED RESTORATIONS

The decision on whether to provide a restoration that is cemented or screw-retained depends on the following factors:

- Appearance.
- Security of fixation.
- Serviceability or future maintenance.
- Space.

A screw-retained prosthesis may have a visible screw access hole but it provides the most secure retention and simplifies any future maintenance. The angulation of the implant may prevent the use of screw-retention of the restoration.

DENTAL IMPLANTS

DETERMINATION OF COLOUR AND FORM OF RESTORATIONS

Shade determination should involve consideration of the hue, chroma and value for the body, cervical and incisal portions of the proposed crown and bridge. This should involve:

- Use of a neutral colour environment.
- A shade guide familiar to the technician and appropriate for the tooth-coloured materials to be used.
- Assessments under different lighting conditions.
- An initial rapid scan of the guide against the teeth to be restored, followed by short duration (<5s) assessments of the suitability of possible shades.
- Time (l5-30s) spent between assessments looking at a blue background colour to minimise the influence of negative after-images.

Shade determination is best completed pre-operatively to minimise errors related to eye fatigue, dehydration of teeth and apparent shifts in shade following the removal of tooth tissues.

Details of features such as areas of opacity and translucency, cracks and any special staining effects required should be recorded as part of the shade determination.

A written and diagrammatic prescription will facilitate the transfer of information between the dentist and the technician.

Where appropriate, the patient and, whenever possible, the technician who will construct the restorations should participate in the completion of the prescription of colour and form. Clinical photographs may be of value in assisting a technician who is unable to examine the patient in person. Electronic colour determination using scanning devices may be helpful but an appreciation of their limitations is required.

Where teeth are to be replaced, the use of a diagnostic wax-up is beneficial and may be used to construct a provisional prosthesis to facilitate patient and dentist understanding of the final form of the restoration prior to beginning definitive prosthodontic treatment. In the case of implant-supported restorations and some tooth supported fixed prostheses, the contours of the provisional restoration may be used to develop soft tissue form adjacent to the crown or fixed prosthesis.

TOOTH PREPARATIONS

Principal considerations:

- Conservation of tooth tissue.
- Control of the path of insertion.
- Optimal retention and resistance form.
- Appropriate clearance in occlusion and articulation.
- The removal of adequate tooth tissue to allow the manufacture of restorations with appropriate contours and aesthetics.
- The retention of basic occlusal and axio-occlusal form.
- The need for well-defined margins of appropriate design, wherever possible on supragingival, sound tooth tissue.
- Damage limitation through the use of atraumatic techniques.

All preparations should be planned taking account of access and with reference to radiographs and study casts.

The equipment for tooth preparation should be well maintained and include an appropriate range of instrumentation.

Decisions regarding the form and dimension of preparations should take account of:

- Tooth morphology and anatomy.
- The quantity and location of remaining tooth tissue responsible for the retention of existing restorations including cores.
- Occlusal relationships and function.
- The need for realignment.
- Relationships with adjacent teeth and soft tissues.
- The material(s) to be used.
- Considerations of long-term sequelae.
- Aesthetic requirements.

If pulp vitality/integrity of the tooth is likely to be put in jeopardy by the extent of the preparation required, then additional preparatory treatment involving orthodontic realignment or elective root canal therapy may be indicated. Specific consent must be sought prior to elective root canal therapy.

When it is intended to remove a finite amount of tooth tissue a guide or preoperative index is a valuable aid to avoid excessive preparation.

IMPRESSIONS

MASTER IMPRESSIONS

PURPOSE

To obtain an accurate, dimensionally-stable, fully-supported impression of the prepared teeth, any dental implants and associated soft tissues.

MATERIALS

- Impression materials should be selected to meet the specific requirements of individual situations on the basis of their physical properties and handling characteristics.
- The impression material(s) used should conform to relevant standards.
- In the set state, all impression materials must be able to withstand effective decontamination procedures.

IMPRESSION TRAYS

Whether custom-made or of the stock variety, impression trays should:

- Have sufficient extension to support an impression of all structures to be recorded.
- Be sufficiently rigid in use.
- Incorporate occlusal stops and, where indicated, features appropriate to aid the retention of impressions.
- Have appropriate features to allow the use of any necessary impression copings for dental implants.
- Have a robust handle, preferably integral.
- Be capable of withstanding autoclave sterilisation if designed for re-use.

TECHNIQUE

- The impression must allow accurate relations to be established between casts within the dental laboratory and provide sufficient information in respect of occlusal form, function and relationships.
- Soft tissue management and moisture control must be effective but atraumatic.
- Impression materials must be used in strict accordance with manufacturer's instructions.

Completed impressions should be:

- Washed thoroughly.
- Inspected carefully.
- Subjected to an effective decontamination procedure.
- Identified.
- Protected and stored in an appropriate manner ready for transit to the dental laboratory in a way which will preclude damage, distortion or contamination.

OPPOSING ARCH IMPRESSIONS

Impressions of the opposing arch are critical to the success of crown and bridgework. While such impressions may generally be successfully completed using alginate, great care is required to avoid the introduction of significant errors in their use.

Impressions of the opposing arch should be handled, decontaminated, protected and stored with the same care adopted for master impressions.

OCCLUSAL REGISTRATION FOR WORKING CASTS

The purpose of occlusal registration is to allow opposing casts to be related accurately either in a cast relator or an articulator.

A formal registration may not be required if a small number of teeth is being restored and there are sufficient remaining contacts between the unprepared teeth to allow the technician to establish adequately the intercuspal position (ICP) or centric occlusion (CO).

Sufficient information informing the technician which teeth make contact in the patient's mouth on mandibular closure will facilitate this.

MATERIALS

The material selected to record occlusal registrations should:

- Readily and accurately record detail of the occlusal and axio-occlusal tooth surfaces.
- Exhibit limited flow following application.
- Have a working time sufficient to allow correct positioning of the mandible, yet exhibit an abrupt transition to the solid state.
- Be dimensionally stable and capable of being adjusted without distortion when set or in the solid state.

In situations where patients have lost posterior occlusal support, it may only be possible to make an occlusal registration by using wax occlusion rims. However, the limitations of these for fixed prosthodontic work should be recognised.

TECHNIQUE

- The patient should be instructed and rehearsed in the desired position of the mandible.
- The registration material or device should be positioned or applied as appropriate.
- The registration material should not impede or prevent complete mandibular closure.
- Positioning of the mandible should be completed within the working time of the registration material.
- Only reproducible and definable positions of the mandible should be recorded.
- Following the set of the registration material, the positioning of the mandible should be verified and, if required, the registration refined.
- The technique adopted for the removal, cleaning and decontamination, identification and storage of registrations should not result in the introduction of any significant errors.
- The accuracy of the inter-occlusal record should be verified by both the dentist and technician.

PRINCIPAL MANDIBULAR POSITIONS

When adopting a conformative approach (i.e. the crown or bridge is to be in harmony with existing jaw relationships), the intercuspal position (ICP) / centric occlusion (CO) should be recorded.

When a reorganised approach has been planned, it is advantageous if the change in the jaw relationship has been made prior to making the tooth preparations such that ICP / CO and the Retruded Axis Position (RAP) / Centric Relation (CR) coincide. This makes the recording of jaw relationships easier.

FUNCTIONAL RELATIONSHIPS

Correct functional relationships are of considerable importance to the clinical success of crown and bridgework. To facilitate correct functional relationships, registration procedures should include a facebow transfer. Lateral and protrusive registrations are often recommended, but in the dentate patient confer little benefit where there is reasonable anterior guidance. Appropriate records to allow the duplication of the anterior guidance may be helpful for the restoration of anterior teeth: this is particularly the case where multiple restorations are planned.

The use a functionally-generated path (FGP) technique can create an inter-occlusal record of assistance in providing information about the relationship of antagonist teeth to posterior preparations on mandibular closure and mandibular excursions.

The accuracy of inter-occlusal records should be confirmed by the dentist and technician. The use of shimstock foil, a split-cast technique or copings are all techniques which may assist in achieving accuracy in relating working casts. However, the quality of the inter-occlusal record remains paramount.

PURPOSE

Temporary restorations:

To restore, protect and maintain the position of prepared teeth between appointments and until the placement of the final restoration.

Interim :

Interim prostheses may be required to maintain form and function during treatment involving the use of dental implants. Tooth-supported prostheses are preferable in this respect.

QUALITIES

Provisional Restorations:

Temporary restorations may also be used to test form and function and develop soft tissue contours adjacent to the restoration: these are more appropriately termed "provisional restorations". Provisional crowns and bridges should incorporate most of the qualities of the final restorations which will replace them. These should include:

- Restoration, or where indicated, improvements in tooth form and function.
- Marginal adaptation and seal.
- Minimal tissue response and favourable hygiene features. Care needs to be taken to ensure a good quality of marginal fit without ledges and an adequate reproduction of embrasure space to facilitate oral hygiene.
- Fracture and wear resistance sufficient for anticipated time in clinical service.
- Properties which serve to protect the health of the underlying dental tissues.
- Functional comfort and control of sensitivity.
- Acceptable appearance.

TECHNIQUE

There is much to commend a replica technique for the fabrication of provisional crown and bridgework in situations in which tooth form and function should remain unchanged. However, there are a number of methods which may all give acceptable results. Practitioners nonetheless need to be aware of the advantages and limitations of the method selected.

When planning a significant change in form or function the diagnostic wax-up can be used to produce an index for the production of provisional restorations. This approach allows the clinician to assess the patient's response to the proposed changes prior to the construction of the definitive restorations.

During the fabrication and placement of provisional crown and bridgework care is required to ensure:

- Occlusal accuracy.
- Maintenance of pulpal and periodontal health.
- Good marginal adaptation.

Temporary and provisional restorations should be cemented to the teeth with a material that provides an adequate marginal seal but has physical properties that allow removal of the provisional restoration without damage to underlying preparation.

TEMPORARY, PROVISIONAL AND INTERIM RESTORATIONS IN FIXED PROSTHODONTICS

PURPOSE

To record and communicate precise details of all aspects of the crown and bridgework required.

Laboratory prescriptions are best completed together with the technician. In situations in which this is impractical, misunderstandings and omissions in prescriptions may be minimised by effective clinician/technician liaison, including the clinician inspecting various stages of the laboratory work, notably working casts and wax-ups.

REQUIREMENTS

Laboratory prescriptions should include:

- The clinician's name, practice address and contact telephone/fax number(s) or e-mail address.
- Details of the patient:
- Name, initials or reference number.
- Age.
- Sex.
- Any relevant photographic records available.
- Pertinent aspects of the social history.
- Summary of the treatment being undertaken:
  - Overall plan.
  - Stage of treatment.
  - Present work.
  - Subsequent care.
- Details of the teeth and/or implants involved (number/notation), the type of crown or prosthesis to be constructed, the design for any dentures to be subsequently provided/replaced and, where appropriate, information regarding contingency and long-term planning should be given.
- Date and time of recording impressions.
- Date and time for latest return of completed laboratory work.
- Unambiguous statement of type of alloy(s) and other material(s) to be used.
- A detailed description of the design features for the crown or bridge, including directions regarding:
  - Form and function, not forgetting pontics.
  - Materials to form margins and occlusal contacts.
  - Shades and characterisation.
  - Surface features and finish.
  - A description of the occlusal registration(s) provided.
  - Miscellaneous clinical observations and specific patient requests.

The use of labelled diagrams together with study casts, diagnostic wax-ups and impressions of temporary or provisional restorations greatly facilitates communication. Clinical photographs may assist the technician in the design of crowns particularly with aspects of form and surface texture but should not be relied upon to communicate colour accurately.

LABORATORY PRESCRIPTIONS

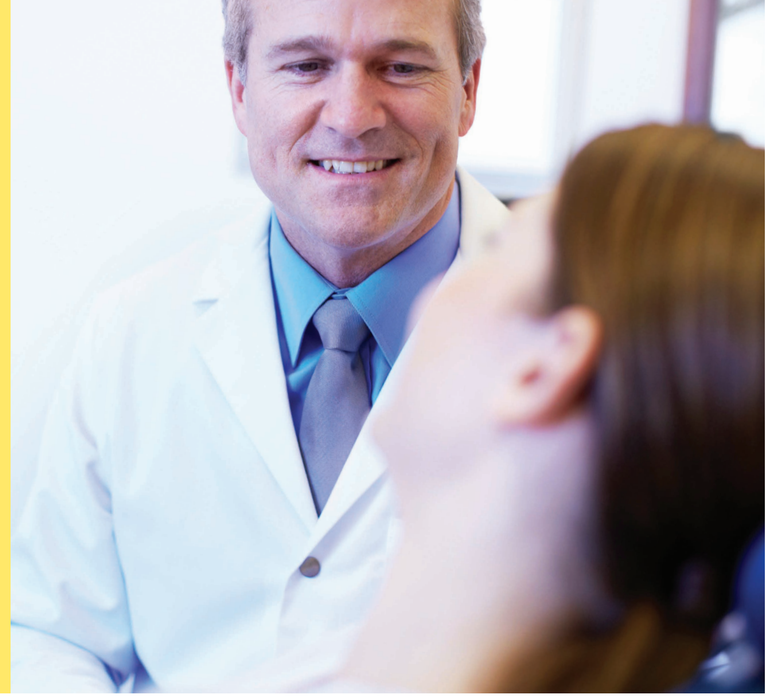
PURPOSE

To confirm the clinical acceptability of completed or partially completed crowns or fixed bridges in terms of:

- Seating and marginal adaptation.
- Contacts and relationships with adjacent and opposing teeth.
- Form.
- Aesthetic qualities.
- Patient acceptance.

PRINCIPLES

- Prior to an appointment for try-in the restorations should be carefully inspected, together with the master casts and when available the impression of the preparations, to confirm satisfactory completion of the laboratory work.
- Assessment of the acceptability of restorations, at the time of try-in, may be facilitated by the use of magnification or radiographs for implant-supported restorations.
- Any minor adjustments or further laboratory instructions are generally best completed while the patient is still present.
- If a crown or bridge is considered to be unsatisfactory at try-in the cause of the problem should be identified before modifying or remaking the item.
- Consideration should be given to temporarily cementing crowns and bridges which, for example, alter vertical face height or change aesthetics or occlusal functional relationships despite satisfying immediate criteria for clinical acceptability.
- Having patients confirm the comfort and their acceptance of the appearance of crowns and bridges should be considered a routine element of try-in procedures.



TRY-IN

The final placement of tooth-supported and implant-supported restorations has a number of common elements but also significant differences.

FINAL PLACEMENT OF RESTORATIONS

TOOTH-SUPPORTED RESTORATIONS

AIM

To cement/bond crowns and bridges considered to be satisfactory by both the operator and the patient at the time of try-in or following a period of temporary cementation.

The luting system should be chosen with the following in mind:

- The nature and condition of the prepared tooth.
- The fit-surface finish of the restorations.

The preparations should be cleaned, isolated and, where indicated, primed and conditioned as required for the cement selected. The luting system should be dispensed, mixed and applied in strict accordance with manufacturer's instructions whilst the operating field should be controlled.

The final restorations must be fully seated within the available working time using appropriate techniques to overcome the effects of hydraulic forces. While it is highly desirable to have some excess luting material present along the entire margin of the restoration, completely filling the restoration with cement will impede the seating of crowns and fixed bridges.

The restorations must not be allowed to move relative to the underlying preparation(s) during the critical initial set or polymerisation of the lute. At this time special precautions may be required to isolate and protect the luting material used.

When set, the excess luting material should be removed using instruments and techniques least liable to cause damage. It is of particular importance to ensure that no excess cement is left in interproximal or subgingival sites.

Newly cemented/bonded crowns and bridges must be examined with particular regard to:

- Degree of seating.
- Proximal contacts and relationships with adjacent and opposing teeth.
- Occlusal function.

Where indicated, suitable adjustments should be completed, including refinishing of roughened areas.

IMPLANT-SUPPORTED CROWNS AND FIXED PROSTHESES

AIM

To attach securely crowns and bridges considered to be satisfactory by both the operator and the patient at the time of try-in or following a period of temporary use.

The final restoration may be screw-retained or cemented to an abutment attached to the implant.

SCREW-RETAINED CROWNS AND PROSTHESES:

- The final restoration is seated and retained by a screw, tightened to the manufacturer's recommended torque.
- The screw hole is restored with a direct restorative material.
- Beneath the direct restoration but separating it from the head of the retaining screw is a plug of intermediary material usually either PTFE tape or light-bodied impression material.

CEMENT-RETAINED CROWNS AND PROSTHESES:

- Small volumes of cement should be used to minimise extrusion of excess cement into the surrounding tissues.
- The area overlying the abutment-retaining screw should be protected by PTFE tape or a plug of impression material.
- It is of particular importance to ensure that no excess cement is left in interproximal or subgingival sites.

FOR ALL RESTORATIONS

Before discharging a patient, following the placement of crowns and bridgework, suitable instructions should be given regarding immediate care, action to be taken in the event of post-operative pain or discomfort, and appropriate oral hygiene measures.

INITIAL REVIEW

Purpose

To assess the patient's response to the restorations and to deal with any postoperative difficulties, concerns, pain or discomfort which arise after placement.

PROCEDURE

- During the initial review, attention should be paid to patient satisfaction and comfort.
- Proximal contacts and relationships with adjacent and opposing teeth should be checked.
- Special note should be made of the initial tissue-response and the effectiveness of the patient's oral hygiene maintenance in relationship to the restorations.
- Where indicated, suitable adjustments should be completed with all altered surfaces being refinished.
- Where indicated, further instructions and advice should be given regarding oral hygiene maintenance.

LONG-TERM REVIEW

Long-term reviews of crowns and fixed prostheses should form part of routine recall examinations. These examinations should, from time to time, include radiographic examinations using intra-oral films.

Care needs to be taken during long term review to ensure that the cement lute remains intact for all tooth-supported indirect restorations. This is of particular importance for fixed bridges or linked crowns where failure of the cement lute may lead to rapid and extensive dental caries.

Follow-up of implant patients is just as important as for those who have received tooth-supported crown and bridgework: radiographs are advisable one year following treatment to check that coronal bone levels have been maintained. All patients should be reviewed at least annually. They should be encouraged to return to the provider of the implant treatment if they feel that there has been any deterioration.

To monitor clinical performance and any deterioration in acceptability, detailed records should be kept of clinical observations made during reviews of crown and bridgework.

When a dental hygienist or other dental care professional is part of the dental team undertaking long term care of crowns and bridges he/she must be aware of the specific maintenance issues and potential modes of failure.

CONCLUDING REMARKS

The provision of crowns and fixed bridges to a high standard is an exacting task for the whole dental team, clinician, technician, nurse and other support staff, as well as for the patient. Provision of high-quality crown and bridgework accompanied by excellent maintenance can produce long-term success which is rewarding for both the patient and the dental team.

The Society hopes that these guidelines are helpful and act as a practical reminder of the standards that we try to achieve. Guidance notes are never complete, and these are no exception. The Society will be reviewing this document at regular intervals for accuracy and in the light of contemporary thinking. Any comments you may have would be gratefully received and should be addressed to the Honorary Secretary of the Society.

Richard Ibbetson
Ken Hemmings
Ian Harris

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THE BRITISH SOCIETY
FOR RESTORATIVE DENTISTRY

The Chapter House, Bristol Dental Hospital, Lower Maudlin Street, Bristol BS1 2LY