

TREATMENT PLANNING FOR THE SEVERELY DISABLED: IMPACT ON PROSTHETIC, RESTORATIVE, AND SURGICAL SERVICES

Purpose of this Module

This module is designed to provide the institutional dentist with an understanding of the challenges brought to the dental operatory by severely and profoundly developmentally disabled patients. The focus is on the modification of routine dental procedures, thereby allowing for the provision of quality dental services for these patients. For purposes of this module, the term "severely mentally retarded" will include both severely and profoundly mentally retarded. Also, the term "parents" refers to parents or guardians.

Learning Objectives

After reviewing the written material, the participant will be able to:

1. State the major limitations presented by the severely mentally and physically disabled individual which affect the choice of treatment plan.
2. Discuss the rationale for choosing short acting local anesthetic agents when treating developmentally disabled individuals.
3. Discuss three indications and three contraindications to the use of rubber dam with developmentally disabled individuals.
4. Discuss possible modifications of routine radiographic procedures when providing care for this population.
5. Discuss the rationale for the use of amalgam as the restorative material of choice for most clinicians in treating the severely disabled patient.
6. Discuss the rationale for the use of posterior composite material and amalgam in the restoration of anterior teeth for the severely disabled patient.
7. Discuss the use of stainless steel crowns as a definitive restoration for permanent teeth.
8. Discuss the problems encountered in Fixed Partial Denture construction and insertion in the severely disabled population and give examples of how these problems may be addressed.
9. Describe a design modification which will result in a Fixed Partial Denture construction which is more resistant to porcelain fracture.
10. Describe a Fixed Partial Denture design which will allow the replacement of a missing tooth while maintaining an existing diastema.
11. List the advantages of the use of an all acrylic/wrought wire clasp Removable Partial Denture in the treatment of missing teeth for the mentally impaired patient.
12. Discuss the role of the caregiver in removable prosthetics with the severely disabled patient.
13. Besides patient cooperation, list five issues which negatively impact the use of complete and partial dentures in the severely disabled population.
14. Define a surgical technique which allows reduction of gingival bulk while maintaining keratinized tissue covering the surgical site.
15. Describe the major objection to periodontal surgery for the severely disabled patient.
16. List the three major difficulties encountered in diagnosis and treatment of pupal necrosis in the severely disabled patient.
17. Describe four modifications of traditional endodontic therapy which may be utilized in treating the severely disabled patient.
18. Discuss the rationale for maintaining mobile permanent teeth in this population.
19. Discuss the limitation of orthodontic therapy for this population.

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INTRODUCTION

The routine challenge of providing clinical dentistry is significantly compounded when treating severely and profoundly developmentally disabled patients. In this module the focus is on treatment planning for the severely disabled patients.

The challenge for dentists is to adapt and modify usual and customary treatment procedures, including the use of various dental materials, to the unusual clinical conditions and limitations encountered when providing treatment to these patients. It will be assumed that the dentist fully understands the usual requirements of various treatment planning options, including the adaptability and limitations of each dental material utilized. The focus will be on unusual and innovative adaptations of the customary treatment options, adaptations that are usually not covered in dental schools and rarely encountered in a typical dental practice.

Three issues should be fully understood. First, any modification of usual and acceptable dental treatment is the result of the limitations of the patient rather than limitations of the dental clinician. Secondly, it should be very clear that the vast majority of MR/DD patients require little or no modification of customary dental services. Even with severely and profoundly physically and mentally disabled patients, not all procedures need to be modified or treatment expectations compromised. Thirdly, it should be strongly emphasized that modification of treatment selection, to meet the limitations of a particular individual, in no way implies the acceptance or advocacy of a lesser level of care for the disabled population. In fact, these modifications are a means to provide each individual with a treatment plan which allows the fullest possible utilization of dental services.

Many of the challenges of the severely retarded individual are reviewed in previous modules, especially Modules 1 through 4. The major challenges that affect choice of individual treatment plans include: (a) uncontrollable head movement, especially sudden severe jerking movement; (b) inability to follow instructions necessary for certain clinical procedures; (c) the pooling of saliva due to swallowing dysfunction; (d) the tendency to choke or obstruct the

airway due to swallowing dysfunction or impairment of normal reflexes; (e) the past history or future expectation of orofacial trauma due to seizures, cerebral palsy, self injurious behavior or other issues; (f) medications taken for seizure control, behavior control or other conditions; (g) major medical disabilities such as blindness, deafness, major medical conditions such as tracheostomy or gastrostomy and other medical disorders; (h) presence of severe gingivitis and/or periodontal disease associated with the common presence of very poor oral hygiene often not amenable to change; and (i) lack of diagnostic information due to the inability of the patient to communicate and/or the inability of the patient to cooperate with radiographs.

Two additional concepts should be clarified. The first is that treatment planning for any patient is on an individual basis whether the individual is disabled or not and treatment choices change as individual conditions change. Secondly, each clinician will approach the need for modification of treatment choices differently and will interpret the advantages and disadvantages of each treatment choice or modified treatment choice in a different manner. Thus, effort has been made to provide various viewpoints on the use of dental materials and modifications of treatment planning.

GENERAL CONSIDERATIONS

O Local Anesthetic

Several issues arise concerning the use of local anesthesia with this population. One of these is lip biting. Some practitioners consider the incidence of lip biting to be surprisingly lower than in the non-disabled pediatric population while others disagree. However, when lip biting does occur it is usually much more severe and sometimes dramatically severe. Consideration should be given to choosing a short-acting local anesthetic to reduce the possibility of post-operative trauma from lip biting especially in patients who have previously demonstrated this tendency. Another choice would be to avoid mandibular blocks and utilize infiltration, periodontal ligament

injection, and other techniques only. If severe lip biting is encountered in the dental environment prior to discharge of the patient, physical restraints together with an intraoral prop (usually consisting of several tongue blades bound together with cloth tape) may be indicated for the 1-3 hours until the sensation has returned.

A second issue with local anesthesia is the inability to determine from a non-communicative patient when an acceptable level of anesthesia has been obtained. When in doubt second injections and alternative routes (e.g., buccal, mylohyoid, intraligamentary) should be utilized. The issue of determination of pain is a sensitive one for the clinician. A rhythmical or cyclic crying or moaning usually is not indicative of pain in a non-communicative patient. However, a sharp cry or sudden change in vocalizations may be indications of pain perception.

An unresolved issue in treating these patients is a common concept that severely retarded patients have a higher pain threshold than the general population. Many experienced clinicians are convinced that these patients indeed do not perceive minor or moderate pain as do other individuals. Whether their perception of pain is different or merely their reaction is different is unclear.

Regardless of perceived pain thresholds, many clinicians will choose not to use local anesthetic when the procedures involve minor restorative needs (e.g., small buccal pits or minor occlusal decay). This treatment choice is especially viable when treating a thrashing patient whose head movements are difficult to control. Injecting such a patient can be extremely difficult and may pose a significant danger to the patient and the staff. When injecting a thrashing patient, some clinicians choose a shorter needle and/or a larger gauge needle which is less likely to be bent or broken.

O Rubber Dam

The decision to use a rubber dam with these patients varies considerably among clinicians. With decreasing levels of patient cooperation, the rubber dam is often difficult to place and the necessity for securing the clamp becomes particularly important. Patients who have a significant potential for vomiting may be at increased risk of aspiration when the rubber dam is used. Also, patients who are entirely or partially mouth breathers (very common with this popu-

lation) are often terrified by perceived airway obstruction when the dam is used.

However, the rubber dam is of benefit to many patients for whom application is less difficult. The isolation afforded by the dam is particularly important for patients whose cough reflex (or pharyngeal reflex) is impaired. These patients are at increased risk of aspiration, particularly during restorative and endodontic procedures. Also, the dam is of particular help in obtaining a dry field with individuals who hypersalivate or who pool saliva in the floor of the mouth due to swallowing dysfunction. Additionally, it is a significant help in individuals who cannot control tongue movements. On the other hand, some of these patients have such strong and persistent tongue movements that the retention of even the strongest rubber dam clamp is impossible. With these patients, as with most patients, the retention of the rubber dam clamp (usually with dental floss) to avoid aspiration is imperative. There are alternatives to the traditional rubber dam which may be considered such as Viradent's Quickdam®.

O Radiographs

Although the issue of radiographs has been discussed in previous modules, it should be emphasized that the inability to obtain diagnostic radiographs is common with patients with maladaptive behaviors or body movement due to cerebral palsy. Treatment planning is clearly affected by the inability to obtain radiographs, or the ability to radiograph only certain teeth (e.g. anteriors only), or the ability to obtain radiographs only under general anesthesia. It should also be clear that the choice of treatment techniques may be more or less affected by the lack of diagnostic radiographs, depending upon the treatment required. For example, treatment choices in pulp capping and endodontic therapy may be more affected by the lack of diagnostic radiographs compared with routine restorations and periodontal surgery.

The use of a film positioning device such as the Snap-A-Ray® may be helpful in obtaining intraoral films for patients who cannot properly hold a film. If the dental staff must assist in film placement during exposure, the use of a protective (lead lined) full apron, gloves and thyroid collar or movable protective barrier is mandatory. Staff assisted radiographs are usually possible for anterior teeth with little difficulty. Posterior radiographs are much more difficult and may be impossible due to strong tongue movements.

Other options are extraoral radiographs using extraoral cassettes (i.e. 5x7 inch cassettes for lateral jaw radiographs), occlusal film taped to the patient's cheek or panoramic radiographs. Additionally, the medical radiologic technologist, if available, can be an excellent source of additional radiographic information. Dentists may order head films such as lateral, lateral oblique, and posterior/anterior for diagnosing dental disease. Surprisingly, many patients who violently resist intraoral radiographs will tolerate extraoral radiographs or panoramic radiographs. It should be understood that even a compromised or poor panoramic film (due to patient movement) still reveals a wealth of valuable data.

RESTORATIVE PROCEDURES

O Amalgam Restorations

Amalgam remains the primary choice of restorative materials for most clinicians in treating the severely disabled patient. The advantages of this material, for this population, are numerous. Amalgam is less technique sensitive than most other materials (e.g. composites or glass ionomers) and is particularly useful in situations where a dry field or even a marginally dry field is impossible to obtain. The clinician is usually more experienced with amalgam than with other materials; therefore speed of placement due to this experience, combined with the inherent qualities of the material, is important in treating the individual with maladaptive behaviors or movement disorders. Amalgam placement requires only one appointment in contrast to some other materials and restorative choices. Amalgam is also more resistant to fracture when exact occlusal adjustment is impossible due to patient behavior. Resistance to fracture can be further enhanced by deeper and more narrow preparations and by over carving when occlusion is in doubt. The use of articulating paper and careful testing of occlusion is impossible in many of these patients. Another advantage of amalgam is its longevity even when placement is compromised by patient limitations. Resistance to displacement and longevity are significant concerns when treating extremely difficult patients requiring sedation and restraints.

Although often difficult to place in an uncooperative patient, bases and liners offer significant benefits in the reduction of post-operative discomfort (e.g., thermal sensitivity) for patients who are unable to communicate their discomfort. Thus, special effort

should be given to their use. If patient cooperation permits, the glass ionomer liners should be considered for their fluoride leaching properties. In placing bases, there is always the trade-off between post-operative sensitivity prevention and the reduction of amalgam thickness which reduces resistance to fracture.

Although the use of pins to augment amalgam retention is useful in restoring badly broken down teeth, placement is often difficult in the uncooperative patient. In these patients, pulp exposure and the risk of aspiration of a loose pin are significant concerns. The use of mounted pins increases the dentist's ability to place pins appropriately. Alternative retentive measures such as retentive boxes, pot holes, or reverse tapered grooves may be helpful in patients where pin placement is contraindicated.

The new generation bonding materials (e.g. Allbond®) are especially exciting due to their ability to bond amalgam to tooth structure and existing amalgam. These materials are less technique sensitive than their predecessors and often allow for the restoration of a tooth with amalgam while significantly increasing the support of the remaining tooth structure. Furthermore, the exceptional bonding characteristics eliminate the need for additional bases or liners.

When esthetics is of secondary concern, the placement of amalgam in anterior teeth offers obvious technique and longevity advantages for the difficult-to-treat patient. If amalgam is the treatment choice for an anterior tooth, explanation as to why more esthetic choices were not utilized should be made to the patient's caregivers and parents.

The issue of pulp capping relates to the use of all restorative materials and cast restorations and elicits strong and often opposing views from many clinicians. Many believe with patients who cannot communicate pain, pulp exposures should dictate extractions or endodontic therapy only. Some make exceptions for mechanical exposures. Still others oppose direct pulp capping and support indirect pulp capping procedures. Although there is no clear consensus on this issue, most clinicians agree that the ability of the patient to communicate pain or discomfort, the ability to monitor pulp vitality through pulp testing, the ability to monitor periapical pathology through radiographs, and the relative importance of the tooth in question all play a part in the clinician's decision.

O Composite Restorations

Composite restorations, like amalgam, are common choices for the clinician in restoring the dentition of severely handicapped individuals. Although more technique sensitive than amalgam restorations, they share the advantage of requiring only one appointment for placement. The presence of severe gingival bleeding, common to many patients with poor oral hygiene, is a distinct disadvantage for this material.

Composite materials, more than most restorative materials, continue to undergo rapid development and an accurate and updated description of characteristics and indications are inappropriate for this module. However, certain concepts of use with these patients may be useful for the clinician. Posterior class II composites are rarely indicated for this population due to technique sensitivity and problems with longevity and wear. In badly broken down anterior teeth, where a cast restoration is impossible, the composite crown may be the only alternative to extraction. These may be constructed with autopolymerized composite utilizing a clear crown former, or by incremental placement of light cured composite material. The usual retentive features of pins, grooves, potholes and etching may be employed. In situations where occlusion is not ideal, posterior composite material may be used to restore anterior teeth in order to reduce the likelihood of fracture, although esthetics may be compromised. To improve esthetics in these cases a labial bonding of microfilled esthetic composite (e.g., Silux®) may be helpful. Constructing the composite crown shorter than usual will improve the crown root ratio and will further reduce the possibility of fracture. In utilizing composite crowns in maxillary anterior teeth where occlusion presents a significant wear problem (usually in the cingulum area) the insertion of a small amalgam at the wear point may be effective. The innovative use of combinations of various composite types together with amalgam offers distinct advantages to the clinician treating this population.

O Glass Ionomers

The use of fluoride leaching glass ionomer restorations offers distinct advantages in those patients with high decay rates and poor cooperation. The use of amalgam/glass ionomer materials (e.g. Ketac®-Silver) offers advantages in reduction of technique sensitivity. However, poor cooperation, especially the inability to maintain a dry field, renders the use of this material problematical or occasionally impossible.

Expected improvements in this material, together with innovative technique modifications, such as use of an anti-sialogogue to help provide a dry field may prove beneficial. The combination of glass ionomers with other restorative materials, especially composites, also offers promise, but these new and developing techniques are outside the scope of this module.

O Stainless Steel Crowns

Most practitioners consider stainless steel crowns (SSC) as a definitive restoration for primary teeth only or possibly as a temporary restoration for permanent teeth. However, they have proven to be outstanding restorations for badly broken down permanent teeth for which a cast restoration is impossible. The SSC often offers the only alternative to extraction. A major advantage is that they are easily utilized, require no impression or laboratory procedures, are completed in one appointment and are available in a variety of sizes and configurations for permanent teeth including bicuspid. Their use and indications for primary teeth are well known and will not be discussed further. Another advantage is that they can be inserted in a non-dry field, but this condition may influence the choice of cements used.

The major disadvantage of these crowns on permanent teeth is the relative difficulty in obtaining a good gingival fit compared to primary teeth. This problem sometimes aggravates the preexisting gingivitis presented by many of these patients. This disadvantage is clearly outweighed by the alternative option of extraction. Another problem with stainless steel crown use in this population is that of wear-through at the occlusal contact points due to the thinness of material. Surprisingly, this is not a universal occurrence even in patients with severe bruxism. In these cases, simple replacement of the crown will produce identical wear-through within a short period of time. However, when wear-through is detected early, an excellent procedure is to enlarge and deepen the area with an inverted cone bur and insert an amalgam restoration, usually not requiring local anesthesia. This produces an excellent overall restoration and precludes replacement of the crown which may not fit as well as the original. If wear-through is detected late when decay and/or debris has spread extensively, replacement is the only alternative.

Clinicians differ in their choice of luting agents for cementation of stainless steel crowns in this population. The relative lack of a dry field in many of the

patients often precludes glass ionomer cements. Polycarboxylate cements, phosphate cements, and filled or unfilled resin cements have all proven satisfactory. Some practitioners have advocated roughening the interior surface of the stainless steel crown utilizing a laboratory sandblaster or micro-etcher to improve retention.

CAST RESTORATIONS

The issues concerning utilization of cast restorations, particularly involving fixed partial dentures (FPD) is a source of considerable frustration for the dentist treating severely mentally and physically disabled patients. Clearly anyone with experience in an MR/DD institutional setting is aware of many residents who are disfigured by missing teeth, particularly anterior teeth. The problem, of course, is that the very causes of this tooth loss, primarily trauma, poor oral hygiene and associated periodontal disease, are the same causes that mitigate against tooth replacement with cast restorations. Certainly the technical issues (e.g., strength of abutment teeth, length of span, etc.) involving choice of treatment with cast restorations for the general population apply equally to this population. However, two additional concerns of this MR/DD population compound decision making relative to cast restorations. First, can an adequate restoration be constructed and inserted? Second, do the advantages for the patient clearly outweigh the disadvantages?

The first consideration of problems in cast restoration construction/insertion is usually well understood by the dentist. Patient movement, due to maladaptive behaviors or cerebral palsy, renders adequate crown preparation difficult or impossible. Conscious sedation seldom reduces movement disorders to the degree necessary for adequate crown preparation. The presence of gingival bleeding, commonly seen in these patients, usually precludes adequate impressions. The need to use a mouth prop makes full arch impressions nearly impossible. These disadvantages could be ameliorated by providing these services under general anesthesia, however, this option may not be available. The fact that cast restorations require two (or more) appointments is of concern when sedation or general anesthesia is needed, yet this issue should not be the only factor in decision making. The problem of gingival bleeding can be countered to some degree, by placing all crown margins above the gingi-

val crest which leads to the disadvantage of reduced crown length and retention. Also, this problem may be overcome with selected gingivectomy utilizing electrocautery. Another option would be hydrophilic impression materials (e.g. reversible hydrocolloid), however these materials are usually too technique sensitive to be successfully used with this population. Although the dentist usually is aware of the technical limitations discussed above, the parents and caregivers may not be aware of the impact of these problems. Thus, careful explanation of the technical limitations of cast restorations is required. It should also be clear that these technical issues have significantly less impact on single cast restorations compared with fixed partial dentures.

The second consideration of advantages versus disadvantages of cast restorations, particularly fixed partial dentures, is a more difficult issue for the dentist. The anticipation of future trauma due to seizures or cerebral palsy is a major deterrent to FPD construction. A careful review with the patient's treatment team is a major requirement in accurately assessing the actual (vs. perceived) chance of future orofacial trauma. Often trauma causing tooth loss was an isolated event or one that is not further anticipated due to present seizure control. A controversial issue for dentists is the concern over aspiration of FPD fragments following trauma. Some clinicians are particularly cautious and will not replace missing teeth with an FPD where there is even a history of seizures. Other clinicians feel strongly that if the chance of aspiration following trauma is no greater than with the natural dentition, then an FPD should not be denied the patient solely on this issue.

Another trauma related issue is damage to porcelain-fused-to-metal (PFM) restorations following trauma, especially porcelain fracture. This problem can be contained to some degree by design modifications to extend metal coverage to gingival, proximal and incisal areas. This porcelain facing design will not only reduce the incidence of fractures but allow for repair with composite or other materials. The reduction in esthetics is more than compensated by increased durability and safety. An alternative is the use of laboratory processed acrylic facings. An additional concern in FPD design for this population is the higher incidence of bruxism. When severe bruxism is present the covering of all occlusal and incisal surfaces with metal, as opposed to porcelain, is

almost mandatory to prevent dramatic enamel loss in the opposing dentition.

Also controversial is the impact of less than desirable oral hygiene on the longevity of cast restorations due to recurrent marginal decay. Some clinicians feel that this contraindication has been overstated and can, to a great degree, be overcome by use of glass ionomer luting agents (understanding the limitations of this technique sensitive material), or by rigorous use of topical fluoride agents. A major problem is the lack of durability data on FPD use from the dental literature, even in the general population. In reviewing clinical failures of FPD's in this population, it is often very difficult to determine whether the abutment decayed following luting failure or whether the loss of luting was due to decay.

An undisputed concern is the fact that healthy abutment teeth are involved in FPD construction and, therefore, FPD failure will result in further loss of teeth. This potential loss of teeth needed for function, in order to replace teeth needed primarily for esthetics, is a major consideration. Additionally, the weight of esthetic gain in FPD construction for a severely retarded individual is difficult to ascertain. The patient is almost always oblivious to the esthetic impact of missing teeth. The expected esthetic gain is therefore of primary benefit to parents and caregivers. Yet this esthetic improvement is not to be entirely discounted. The presence of anterior open bite often associated with MR/CP persons usually means that little, if any, functional gain is obtained with the replacement of missing anterior teeth. Many clinicians feel that this small increase in function in replacing anterior teeth in this population is clearly outweighed by the disadvantages. It should be remembered, however, that with less mentally retarded patients, esthetic considerations become a much more important component of the decision making process.

A technical issue often overlooked by dentists is the jaw-to-jaw discrepancy (usually class II) and increased anterior arch length presented by so many MR/DD patients, particularly those with cerebral palsy. The original dentition in these patients usually present significant and even dramatic diastemas between all maxillary anterior teeth. When some of these teeth are lost (usually due to trauma) their replacement with an FPD presents an often insurmountable esthetic challenge. This may be overcome by the use of a lingually placed rigid connector between the

pontic and the abutment, leaving the original diastema.

The use of bonded fixed partial dentures (i.e. Maryland bridges) in this population has not been extensively evaluated, but most clinicians concede a high level of disappointment with this treatment choice. Theoretically, the anterior open bite presented by many MR/CP patients would constitute a technical advantage due to the lack of occlusal interference. However, the increased incidence of oral facial trauma in these individuals is a major contributor to the high failure rates of bonded appliances reported by most dentists.

The recent advances in the use of implants often create unrealistic expectations on the part of parents and members of the patient's treatment team. The many contraindications presented by the severe MR/DD patient, especially the lack of meticulous oral hygiene, nearly always precludes the use of implants as a realistic treatment choice.

Even more than the explanation of technical difficulties, the explanation of advantages versus disadvantages of cast restorations for a given patient to the treatment team is a difficult but required responsibility of the institutional dentist. Similarly, the dentist must be able to discuss the advantages of a perceived improvement in esthetics versus the very real practical limitations encountered in constructing sound cast restorations.

REMOVABLE PROSTHETICS

O Removable Partial Dentures (RPD)

The major advantages of a removable partial denture compared with a cast restoration are ease of construction, ease of repair and ease of replacement. There is often an esthetic advantage, especially in the MR/CP patient whose original dentition presented with significant diastemas described above. The financial advantage of a less costly RPD compared with an FPD is usually not the major concern with institutional residents for whom the highest quality of care is mandated.

The disadvantages of this treatment choice are similar to those for cast restorations, especially the issues of trauma and poor oral hygiene. The RPD is more fragile and much more susceptible to trauma from seizures, falls or self injurious behavior; therefore, the concerns of danger to the patient, especially the danger of aspirated fragments, is an acute concern. Technical modifications, such as use of acrylic

teeth, use of radiopaque or wire/nylon mesh reinforced acrylic or use of an all metal design may reduce this concern. Some clinicians feel this concern has been exaggerated, since very few incidences of aspiration or swallowing of RPD fragments have been reported for the general population (i.e., following falls or other accidents). In patients for whom trauma is not of concern, the use of an all acrylic RPD with wrought wire clasps offers some advantages. These appliances are less likely to be bent than a cast RPD, easy to repair or replace if broken and the clasps are easily adjusted compared with a cast clasp. The ease of replacement is of particular advantage with patients who occasionally "lose" the appliance during episodes of "acting out" behavior.

The concern of increased poor oral hygiene may be an issue when considering an RPD. When oral hygiene is poor, the incidence of decay under a clasp is magnified. However, this decay, if discovered early, is usually easily restored. Therefore, considering the alternative of no tooth replacement for patients for whom a cast restoration is not possible, the issue of clasp generated decay should not be a major factor in treatment planning.

Most severely retarded individuals cannot properly and consistently insert and remove an RPD. Unless this procedure can be accomplished effectively and routinely by caregivers, in addition to their routine oral hygiene responsibilities, the decision to construct an RPD is probably contraindicated.

O Complete Dentures

Fabrication of complete denture requires considerable cooperation on the part of the patient. Patients who are not cooperative enough to allow initial impressions are not usually candidates for successful complete dentures. On the other hand, patient cooperation throughout the multiple steps in complete denture construction does not guarantee the successful use of the prosthesis. Experienced institutional dentists have witnessed the apparently satisfied complete denture patient returning the dentures to the dentist or placing them in their coat pocket prior to departure from the clinic. Some dentists have employed the use of acrylic "stents" as a less costly and temporary method of determining the patient's ability to tolerate an intraoral prosthesis. Unfortunately, there is no information available in the dental literature to guide the clinician in determining which MR/DD candidate will be a successful denture wearer.

Clinicians are usually aware of many other issues that negatively impact the use of partial and complete dentures in this population. These include orofacial dyskinesias which tend to dislodge the denture, gingival hyperplasia due to phenytoin use, use of psychotropic medications which reduce salivary flow and denture retention, lack of adequate alveolar ridge due to previous advanced periodontal disease and skeletal discrepancies, especially class III jaw relationships.

Becoming comfortable with a new prosthesis requires a considerable learning process on the part of the patient. Often this process is beyond the MR/DD patient's abilities. Unless there is a strong commitment on the part of patient's caregivers to work with the patient to insure consistent application of learning behaviors, the construction of a complete denture is probably contraindicated. As with cast restorations and other treatment choices, the dentist must be prepared to articulate the advantages and disadvantages of prosthetic replacement to the patient's treatment team and parents. *The reasons for not replacing missing permanent teeth should be clearly stated in the patient's record.*

PERIODONTAL SURGERY

NOTE: Issues relating to oral hygiene and other preventive measures, especially pertinent to the institutionalized MR/DD patient, are presented in Module 11.

With the exception of patients with Down Syndrome (see Module 4), the management of periodontal disease in the MR/DD population is similar to that of the general population. The major determinate in the initiation, progression and resolution of periodontal disease is the maintenance of oral hygiene. The increased emphasis on plaque control and soft tissue management, including more frequent recalls for root planing and curettage, is the therapy most indicated for these patients. Most dentists agree that unless effective oral hygiene can be consistently maintained, surgical intervention is rarely indicated, and may in fact hasten the progress of the disease. Therefore, since poor oral hygiene is more common in this population, usually due to lack of patient cooperation, the use of surgical intervention is less frequent than in the general population.

When surgery is indicated, the choice of surgical techniques is similar to the general population, with

some exceptions. One of these exceptions is that most severely retarded patients cannot tolerate or maintain a post surgical periodontal pack. It is for this reason that simple gingivectomies are less frequently indicated. Some dentists advocate the use of electrosurgical techniques when performing gingivectomies for individuals who are not likely to maintain a protective dressing. The use of electrocautery may help minimize post operative discomfort. Additionally, a modified flap procedure that leaves more keratinized tissue exposed to oral fluids is often a more appropriate surgical choice. Poor patient cooperation usually precludes the choice of gingival graft procedures and also encourages the use of resorbable suture material. An alternative to the use of a periodontal pack is the use of a tincture of Myrrh and Benzoin (manufactured by Sultan®) which with multiple applications leaves a protective film over raw exposed soft tissue.

The indications for surgical intervention for patients with gingival hypertrophy due to phenytoin use is still unclear. Most experienced clinicians have become more conservative with surgical intervention due to the rapid regrowth of gingiva seen in so many of these individuals. Unfortunately, there are no indicators to predict which patients will demonstrate rapid regrowth after surgery. Almost all clinicians can agree that unless oral hygiene can be controlled, surgical intervention is rarely indicated. Two events that tend to prompt surgery are gingival overgrowth on the occlusal surfaces of posterior teeth producing ulceration and overgrowth of the anterior region producing esthetic concerns. As with many other treatment options, esthetic concerns are usually presented by the parents and caregivers but rarely by the MR/DD patient themselves.

ENDODONTICS

Endodontic therapy is occasionally indicated for institutionalized MR/DD patients. The three main differences involve the relative difficulty in obtaining quality diagnostic radiographs, the lack of symptomatic information from a patient who cannot understand or communicate, and the technical difficulties when behavior or movement disorders are present.

Radiography modifications have already been discussed in the section on radiographs. If radiographs are difficult to obtain, the usual number of radiographs (preoperative, intraoperative and postop-

erative) expected during an endodontic procedure may be reduced. It should also be remembered that endodontic therapy can be accomplished without radiographs. This will clearly reduce the chance of success, but may be preferable to extraction of the tooth. Additionally, the use of an electronic apex locator may also be of some benefit in such patients.

The limited ability of the severely retarded patient to communicate pain and discomfort has previously been discussed in the section on pulp capping. When symptomatic information is not available, the clinician must rely solely on other information such as radiographic evidence, percussion tests, presence of fistulas, presence of deep restorations and other observable hard and soft tissue data. Pulp testing is rarely a helpful procedure with non-communicative patients. Extensive experience is a major advantage to the clinician. Antibiotics and analgesics may be used more routinely in association with endodontic procedures compared with similar treatment of patients who can express symptoms of infection and discomfort.

Behavior or movement disorders are a major deterrent to endodontic therapy. Most anterior teeth can be successfully treated, despite patient movement; however, posterior teeth are significantly more difficult. The use of a rubber dam for tooth isolation is often impossible due to lack of patient cooperation. With difficult-to-treat patients, some endodontic procedures may need to be modified or shortened. Such modifications may include less canal preparation and shaping, fewer irrigations, more simple obturation techniques (gutta percha with sealant or occasionally sealant alone) and particular attention to avoidance of overfilling. If known (or suspected) canals cannot be entered due to patient movement, the employment of medicaments as a fixative for the remaining tissue may be an option. Newer techniques such as ultrasonic filing devices and Thermafil® obturation may be of benefit. Other more complicated thermoplastic obturation procedures are probably contraindicated. In some cases where periapical pathology is evident, a preventive apicoectomy may be indicated to increase the chance of success, especially in anterior teeth with complicating periapical root morphology. The Sargenti® technique advocated by some clinicians offers an advantage in time savings and reduction of technique sensitivity; however, this technique is not widely accepted by the dental community when used with the disabled population. One important but

often overlooked issue is that a compromised or less than ideal endodontic procedure is often preferable to the alternative of extraction in a patient for whom tooth replacement is not a realistic expectation.

It is widely known that tooth structure decreases in strength following endodontic therapy. Consequently, most dentists elect to restore such teeth with a post and cast restoration. The limitations of cast restorations in this population have been previously discussed. Therefore, an intra-coronal restoration with or without a post support may be the best choice. The use of bonded restorations and significant reduction of possible occlusal interferences may also help to decrease tooth fracture.

EXODONTIA/ORAL SURGERY

The modifications of surgical services for the institutionalized MR/DD population relate less to the surgical procedure itself than to the reasons why surgery is indicated. Extraction of teeth with poor prognosis is less frequently indicated when replacement with a prosthesis is not possible. This is particularly applicable to teeth that are mobile as a result of periodontal disease (most recent studies demonstrate that retention of mobile permanent teeth have no positive or negative impact on adjacent teeth). On the other hand, extraction of teeth, especially posterior teeth, with no opposing dentition is sometimes indicated due to the difficulties in oral hygiene maintenance. This is particularly an issue with erupted or partially erupted third molars. In some patients with insufficient oral facial development, the extraction of second as well as third molars will be of benefit to oral health maintenance. Since orthodontic therapy is an impossibility in most of these individuals, the extraction of malposed or ectopically erupted teeth is indicated to enhance the survival rate of the adjacent dentition. This is commonly the case with buccally erupting permanent cuspids. A sensitive subject often raised by the patient's treatment team is the retention of dentition for a patient who is permanently fed by gastrostomy. Most dentists agree that the dentition should be preserved to maintain vertical dimension and for esthetic concerns. However, in those gastrostomy cases who experience heavy calculus formation (see Module 8-B) the extraction of all molars may facilitate the maintenance of oral health yet maintain vertical dimension and esthetics.

The presence of impacted teeth is more common with this population and the decision as to monitoring versus extraction is a difficult one. The lack of cooperation presented by many of these patients precludes the radiographs necessary for proper monitoring, yet also complicates the surgical procedure. Referral to an oral surgeon for extraction of impacted teeth under deep sedation or general anesthesia is the choice of most institutional dentists. The degree of medical fragility and life expectancy of the patient may modify this decision. If persistent pain and discomfort are suspected in a non-communicative patient, then extraction may be the treatment of choice even where supportive radiographs or clinical evidence are not present.

As stated, there are few modifications of surgical procedures necessary for this population. Resorbable sutures are routinely used due to difficulties in silk suture removal in uncooperative patients. The surgical decision to leave root tips or fragments may occur more frequently, especially with non-abscessed teeth, in situations where safe removal is compromised by patient movement. As in endodontic therapy, the routine use of antibiotics and analgesics post surgically may be recommended in patients who cannot communicate or for whom intraoral monitoring is difficult.

ORTHODONTIC THERAPY

Although malocclusions are more common in this population, the ability to provide orthodontic treatment, either fixed or removable, is usually not possible due to lack of patient cooperation and/or poor oral hygiene. This is particularly the case where skeletal discrepancies exist which would necessitate a surgical and orthodontic approach. Unfortunately the patient's parents, caregivers or treatment team members often do not understand the limitations of orthodontic therapy with this population. It is therefore, necessary for the institutional dentist to be sensitive to these concerns and to communicate the severe problems of orthodontic intervention to the parents and treatment team as early into the development of the permanent dentition as possible. It should also be noted that although the vast majority of institutionalized MR/DD patients are not candidates for orthodontic care, there are occasional exceptions. Any institutionalized individual who can tolerate and benefit from orthodontic care should be referred to a specialist for

these services. The institutional dentist should be able to accomplish minor tooth movement procedures for those individuals who will benefit from these services.

SUMMARY

The dentist must be an advocate for the oral health of MR/DD patients and must be able to educate parents, guardians and staff on the advantages and limitations of available dental treatments. The challenges to the dentist in providing treatment to the institutionalized MR/DD population may appear to be overwhelming at times. In no other field of dentistry is the need to modify treatment expectations and procedures greater. Imagination and innovative decision making are mandatory if the dental needs of these individual are to be met to the fullest extent possible.

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