

# DECISION MAKING IN PROSTHODONTICS

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## Abstract:

When faced with a clinical situation requiring intervention, Prosthodontists differ in their choice of treatment. In view of its ever-broadening scope, brought about by many new and improved materials and techniques, Prosthodontic decision-making is becoming increasingly challenging. Even though dental education is based on scientific knowledge and acquired clinical experience, it is possible that variations in clinical decision-making are also influenced by individual preferences and styles. Decision-making of different diverse clinical therapies should include two important aspects of therapy: the efficacy and effectiveness. There are three ways in which a clinician can choose a specific treatment: induction, deduction and seduction. The process is undoubtedly very complex, involving many influential factors, which may be both patient- and dentist-related, the mechanisms involved in the selection; evaluation and application of information remain unclear. Most of the cases are compromised by other conditions orally or systemically that require the Prosthodontist to apply a lot of effort in deciding what the best treatment for each case.

## Keywords;

Paradigms, prosthodontic axioms, burden of illness, non-treatment.

## INTRODUCTION

Treatment decisions are made routinely by the dentist in clinical practice. Decisions to replace missing teeth or defective restorations, to retain or extract periodontally compromised potential abutment teeth or to prescribe a specific occlusal scheme for a restored dentition, confront the busy practitioner almost daily. The decision making process is usually an outgrowth of the mentor's opinions, past experiences and clinical perceptions, plus an ongoing awareness of related clinical research. Other influences such as a patient's financial considerations, also impact upon the process.

Factors that influence need and demand for prosthetic treatment are not properly recognized and seldom considered by dentists. Additionally, variations in clinical decisions are almost ubiquitous<sup>1,2</sup>, and efficacy, effectiveness and cost-benefit parameters are important aspects of intervention that are poorly understood in restorative dentistry<sup>3</sup>. Prosthetic treatment is not uniquely limited to technical aspects. Indeed, it includes multidimensional aspects of patient perceived needs, desires and expectations<sup>4,5</sup>. When these aspects are neglected, a conflict between the amount and extent of treatment dentists believe patients should receive and what patients themselves perceive as treatment need is frequently observed<sup>9</sup>. Patients usually tend to be more positive regarding their oral health. This subjective perception by patients is relevant and professionals should change from making unilateral decisions, and consider the patients' point of view before any treatment decision is made<sup>5,6</sup>.

Clinical prosthodontics is a relatively young science. It is, therefore, understandable that the process of clinical decision-making in this discipline has been regarded as largely an art form and one not readily defined or taught. In fact, clinical educators are frequently suspicious of efforts to develop and apply scientific rigour to decision making<sup>7</sup>.

There is an immediate need to implement scientific methodology for selecting a treatment option. It should be done by

analyzing the clinical efficacy and effectiveness of a particular treatment option<sup>8</sup>. This should include newer treatment options and shedding of set patterns of selecting treatment traditionally.

In this article we will, we will propose a scaffolding for the paradigm of prosthodontic decision-making. But first we will attempt a synthesis of old and new clinical axioms which continue to influence our practice patterns. We have, therefore, organized our material under the following headings: traditional prosthodontic axioms, and a framework for prosthodontic decision-making.

## TRADITIONAL PROSTHODONTIC AXIOMS

A number of expedient undergraduate educational convictions or axioms have evolved probably as a result of necessary early exposure to dental mannequins in pre-clinical education. They advertently or inadvertently continue to influence, if not dominate, many new dentists' decisions. These axioms can be conveniently summed up as follows:

### The 28-tooth syndrome

There is a fallacy of attaining magic figure of 28-tooth complement with all sorts of risky outcomes. Addressing the clinical problem of a compromised masticatory system, that is one with less than 28 teeth, almost invariably poses agonising decisions regarding a patient's functional deficits. Worse still, is the risk of a temporomandibular joint disorder which ominously looms on the patient's horizon. Consequently prosthodontic replacement to ensure a maximum number of bilateral centric stops becomes a noble and necessary prosthodontic endeavor.

The work of Kayser<sup>9</sup> suggests merit for a shortened dental arch, particularly in the elderly, but his analysis has not yet received the attention it deserves. It should however be pointed out that the aesthetic implications of shortened dental arches may well be a compelling reason for patients seeking treatment.

Many a prosthodontist has been confronted by outraged patients who have diligently counted the artificial teeth on their removable prostheses, and concluded that their persisting prosthetic problems resulted from the dentist's failure to put in as many teeth as possible. It appears that the old capitalist tenet 'if a little is good, a lot more is better', may very well be a compelling influence on the decision-making process in a broad sphere of prosthodontic activity.

Witter et al<sup>10</sup> studied 3 groups of patients- 1) Those with complete dentitions, 2) Those with shortened dental arches restored with RPDs and 3) Those with shortened dental arches and no replacement.

The results revealed no significant differences among the groups.

Witter et al<sup>11</sup> conducted a 6-yr follow-up of patients with shortened dental arches and showed that they were occlusally stable.

Shugars et al<sup>12</sup> studied posterior bound edentulous spaces that were either untreated or treated with FPD or RPD, the survival rate of untreated group was not much significantly different than that of FPD or RPD groups but the survival rate of FPD group was significantly better than RPD group.

Also in 2000, Shugars et al<sup>13</sup> showed non-replacement of missing posterior teeth did not lead to rapid or severe collapse of the arch.

So, shedding this syndrome is extremely important for decision making.

**IMPECCABLY EXECUTED CLINICAL TECHNIQUES ENSURE TREATMENT EFFECTIVENESS**

This truism has often been misinterpreted, particularly since it enjoys a sort of motherhood status. However, it can inadvertently lead to the herodontic syndrome which is a close relative of the 28-tooth syndrome. In this condition, the objectives of obsessive plaque control and technological bravura are combined to create baroque intraoral architecture, which can lead to all sorts of gratifying results.

This form of herodontics is not for universal prescription, since it is very labour intensive and demanding, as well as very expensive. One is left with the lingering conviction that the treatment outcome may not be nearly as important as the sophistication of the approach.

**PATIENT MOTIVATION CONTROLS HOST RESPONSE**

Patient motivation is an essential part of the success equation which we desire for the prosthetically altered oral milieu. However, the relationships between quantity and quality of dental treatment, patient response and the sequelae of aging, to name a few crucial considerations, remain major causes for concern in the decision-making paradigm. The works of numerous colleagues<sup>14,15</sup> suggest that, often, more oral disease is encountered in those patients who attend their dentist regularly

As clinicians we are therefore routinely confronted by concerns regarding the numbers and status of teeth present, convictions about technical possibilities, and hopes about how our patients will react to our treatment prescriptions. All of these considerations are dramatic reminders of the complexity of the prosthodontic decision-making equation, one which lacks compelling evidence about the balance between risk benefits and treatment outcomes. Dentists may therefore become vulnerable to subscribing to the notion that treatment should comprise 'Not what they want or think they need, but what is good for them'.

Dentists must learn to differentiate between an idealistic treatment's 'efficacy', and its 'effectiveness' in real-life applications. Efficacy answers the question of whether a therapy 'can work', and effectiveness whether it 'does work.' Following the clinician's viewpoint, although having an efficacious therapy is fundamentally essential, what counts is how well a therapy works in real-life practice, or 'effectiveness.' It is important for the clinician to understand the difference between efficacy and effectiveness since with many prosthodontic therapies it is mainly idealized efficacy results that are published.

Prosthodontic literature has also been weak on patient involvement considerations, such as psychological, ethical and cultural concerns, as well as the economics of professional services.

**PARADIGM FOR PROSTHODONTIC DECISION MAKING**

Any proposed paradigm should reflect a recognition and analysis of the diverse considerations associated with any form of patient treatment. We must at the outset, however, concede our inability to do so.

There are three ways in which a clinician can choose a specific treatment.

Induction means that the clinician bases the choice of treatment on recent clinical experience and/or current concepts of disease aetiology, so as to choose a therapy that 'seems' or 'ought' to work. Pronouncements about therapy based on induction are characterized as 'authoritarian'.

Deduction means that the choice is based on studying the findings of properly designed prospective trials in the published literature. The subsequent advice is characterized as 'authoritative'.

Seduction results from accepting the advice of colleagues, advertisers, and salespersons, even though such advice is untested and often ill-founded.

Only the deductive approach is scientifically acceptable and defensible as honest and fair to our patients.

This classification provides a start for reconciling specific prosthodontic conditions (or their variations) with the salient observations on diagnosis, therapy, and prognosis

Dentistry must develop its own framework for critical

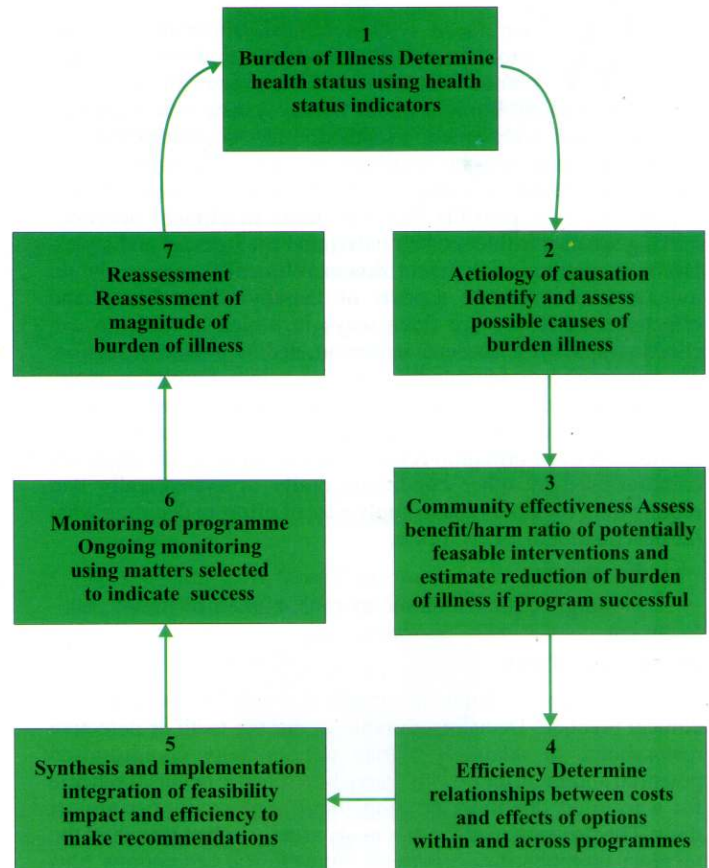


Table 1: The measurement iterative loop: A framework for the critical appraisal of need, benefits and cost of health interventions

appraisal of need, benefits and costs of health interventions

Most common conditions faced by a Prosthodontist - Partially edentulous state, Completely edentulous state. These states are usually attributed to numerous etiologies e.g. congenital absence, caries, periodontal disease, trauma, unfavorable esthetics, and badly judged decisions to extract teeth.

**PARTIALLY EDENTULOUS PATIENT**

Generally speaking children and adolescents require provisional or reversible prescriptions to preclude an increased risk of abutment tooth tissue damage, interference with site

Diagnosis	Burden of illness	Treatment options	Prognosis
1. Missing single teeth (anterior or posterior)	<ul style="list-style-type: none"> <li>Aesthetic concerns</li> <li>speech articulation</li> <li>Masticatory efficiency</li> <li>Concerns about dental arch stability(FPD)</li> </ul>	<ul style="list-style-type: none"> <li>No treatment</li> <li>Provisional (RPD)</li> <li>Adhesive prosthesis</li> <li>FPD (AP)</li> <li>Implant supported prosthesis (TIP)</li> </ul>	<ul style="list-style-type: none"> <li>Short-term studies for AP and TIP underscore restricted scope. TIP appears more promising</li> </ul>
2. Missing multiple teeth(anterior or posterior)	<ul style="list-style-type: none"> <li>Aesthetic concerns</li> <li>Functional ones: speech articulation, compromised incision and/or trisuration of food</li> <li>Reduced vertical dimension of occlusion with severe aesthetic and/ or functional sequelae</li> </ul>	<ul style="list-style-type: none"> <li>No treatment</li> <li>Provisional RPD</li> <li>Definitive RPD</li> <li>Fixed cantilever</li> <li>AP (restricted by length of span)</li> <li>FPD (as in AP)</li> <li>RPD/FPD</li> <li>TIP (restricted by anatomical structures, e.g. inferior alveolar canal)</li> </ul>	<ul style="list-style-type: none"> <li>FPD and RPD suggest a range of morbidity features</li> <li>Design of relevant studies demands prudent interpretation of results</li> </ul>

Table 2: Current treatment options available for partially edentulous patients, with missing single or multiple teeth.

growth or age-related alterations in dental arch integrity.

Quite obviously an anterior deficit is invariably an aesthetic and less often a concern for speech articulation. This is particularly the case when generous circum-oral activity is present. Posterior deficits, however, are less aesthetically consequential, but are significant from a functional or space maintenance point of view. The perceived psychological advantage inherent in fixed solutions appears to be a strong incentive for the current interest in

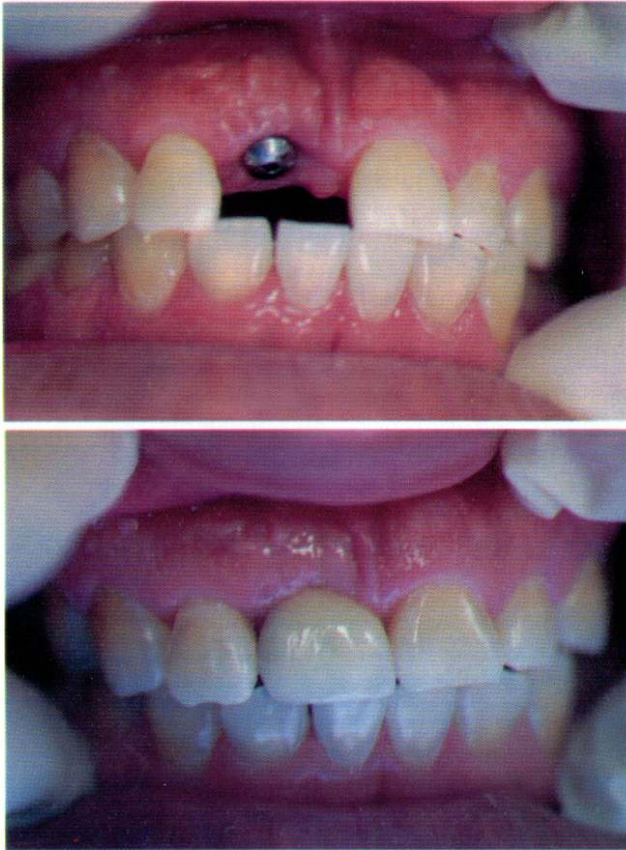


Figure 1: Treatment option for missing single anterior tooth(1)

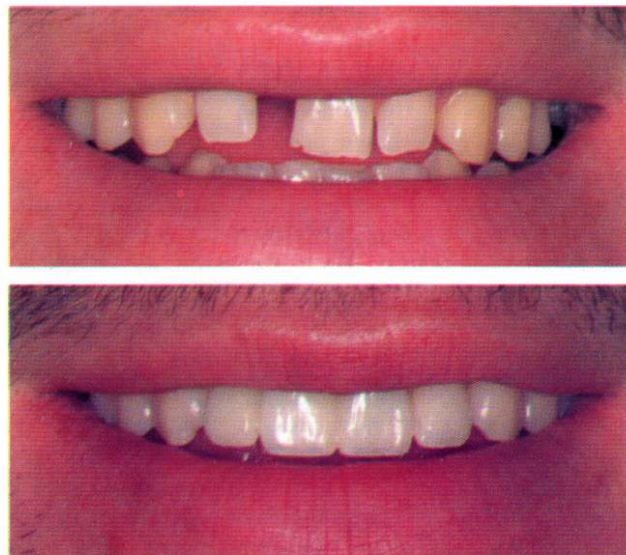


Figure 2: Treatment option for missing single anterior tooth(2)

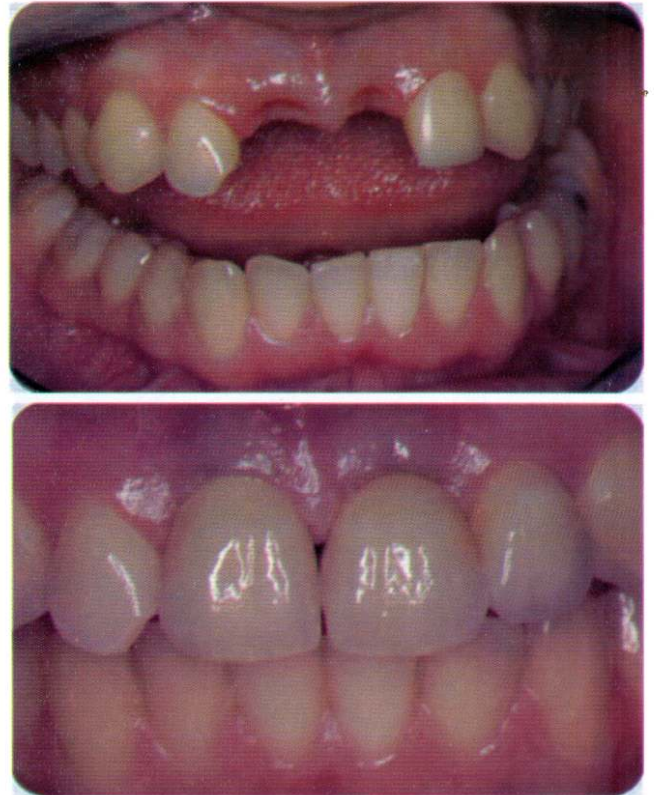
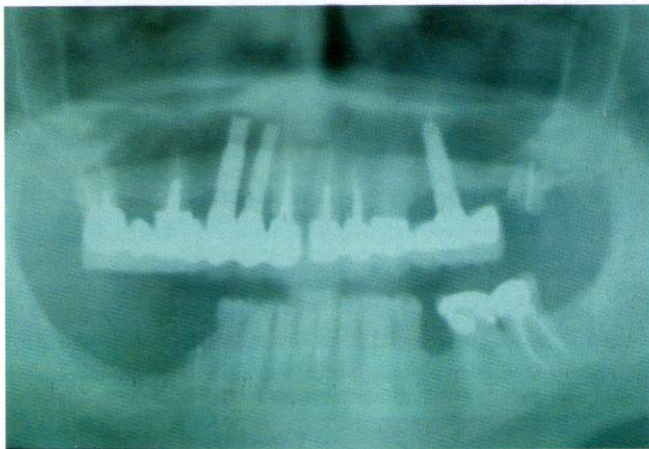
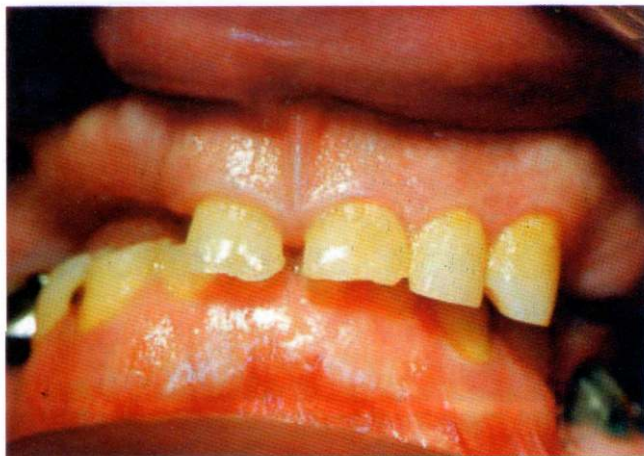


Figure 3: Treatment options for missing anterior multiple teeth. Rehabilitation with FPD.



Figure 4: Treatment options for missing single posterior tooth. Rehabilitation with FPD.



**Figure 5: Rehabilitation of missing multiple posterior teeth with implants and FPD**

Patients with combinations of partial edentulism and advanced periodontal disease present the dentist with several well-recognized consequences of a combined morphological and infective predicament." Treating such patients in the past often entailed a commitment to retaining as many teeth as possible, and at any cost. The 'least-bit-of-retained-periodontal-ligament-is-better-than-none' school of decisionmaking made significant inroads into the earlier school of treating disease with extraction forceps and putting all the dentist's faith in removable prosthodontic solutions. Clearly neither school was entirely correct, and often decisions were influenced significantly by considerations of cost rather than rational evidence-based information. The advent of OI has expanded the scope of treatment planning for such patients as well.

Diagnosis	Burden of illness	Treatment options	Prognosis
Single and/or multiple missing teeth with advanced periodontal disease	Compromised function, aesthetics and psychological self-concept	<ul style="list-style-type: none"> <li>• Symptomatic</li> <li>• implant supported prosthesis or definitive RPD or overdenture service</li> <li>• FPD restorations</li> <li>• Intermediate dentures</li> </ul>	<ul style="list-style-type: none"> <li>• Largely anecdotal</li> <li>• Variable and sometimes unpredictable morbidity</li> </ul>

**Table 3: Current treatment options available for partially edentulous patients with advanced periodontal disease.**

### THE EDENTULOUS PATIENT

This morpho-functional predicament deserves some emphasis for two reasons:

1. It traditionally offered the least scope for treatment options,

2. Its treatment via oral implantology (OI) has become both the catalyst for, and the yardstick by which, partial edentulism may be managed with the OI technique.

Tooth loss, culminating in the edentulous state leads to different degrees of deficit in the qualitative and quantitative nature of residual support. Such a compromise in load-bearing potential is rendered even more overt as a result of congenital anomalies or oncological and trauma-related surgical endeavours. This compromised tolerance may be reduced even further by reduced salivary flow, and by systemic factors, such as nutritional deficiencies, blood dyscrasias and hormonal imbalances. Several consequences of aging may also contribute to a reduction or lowering of the limits of mucosal tolerance and militate against continued mucosal health. Elderly patients frequently present with a wide variety of age-associated changes which include diseases, medications and in those fee-for-service situations, limited financial resources.

Nevertheless, it appears that a large number of patients are satisfied with the functional aspects of their dentures, often in spite of technical imperfections identified by dentists<sup>16,17</sup>. Regrettably, a number of complete denture wearers are dissatisfied with one or both dentures. These so-called maladaptive patients remain dissatisfied with their prosthetic experience, even after they have been provided with technically impeccable dentures<sup>16,17,18</sup>.

The data suggest that causes of maladaptation are not exclusively technical or morphofunctional ones, but may also be due to psychosocial, economic, or even cultural factors.

Most dentists tend to regard this predicament as anatomical and physiological or else psychological, in origin. They are therefore inclined to treat such so-called maladaptive patients via modification and improvement of denture or occlusal materials and fabrication techniques, plus occasional surgical attempts to enlarge the denture-bearing areas. Sometimes these patients are dismissed as chronic complainers and even regarded as needing psychiatric help to cope with their maladaptation.

The techniques of enlargement of denture-bearing areas have been largely variations on the themes of sulcus deepening or ridge augmentation with autogenous or alloplastic bone grafts. Both techniques appear to have enjoyed popularity with our surgical colleagues, in spite of the prosthodontic community's lingering concerns about the documented risks of associated morbidity. Given the nature and quality of the reported effectiveness of this treatment, they are, at best, well-intentioned but halfway biotechnologies<sup>19</sup>.

Attempts to list treatment options for the edentulous patient, which reflects current interpretations of available evidence, In spite of the popular acceptance of these diverse treatment choices, it must be conceded that the process of iterative monitoring of these health interventions is still of uneven scientific merit. However, the process is more advanced than it is for treatment of the

partially edentulous predicament

Diagnosis	Burden of illness	Treatment options	Prognosis
Without prior dentures		<ul style="list-style-type: none"> <li>• Implant-supported overdentures</li> <li>• Optimised complete dentures</li> <li>• Implant-supported fixed prosthesis</li> </ul>	Given the lack of denture experience, methodological rigor and practically useful results from studies involving presumed
With adaptive denture experience		<ul style="list-style-type: none"> <li>• Optimised complete dentures +/- resilient liners</li> <li>• Implant-supported overdentures</li> <li>• Implant-supported fixed prosthesis</li> </ul>	Successful treatment outcome with complete dentures remains unpredictable
With maladaptive denture experience		<ul style="list-style-type: none"> <li>• Implant-supported overdentures</li> <li>• Implant-supported fixed prosthesis</li> </ul>	Uncertain- varies patient to patient

Table 4: Current treatment options available for edentulous patients.



Figure 6: Rehabilitation with complete dentures

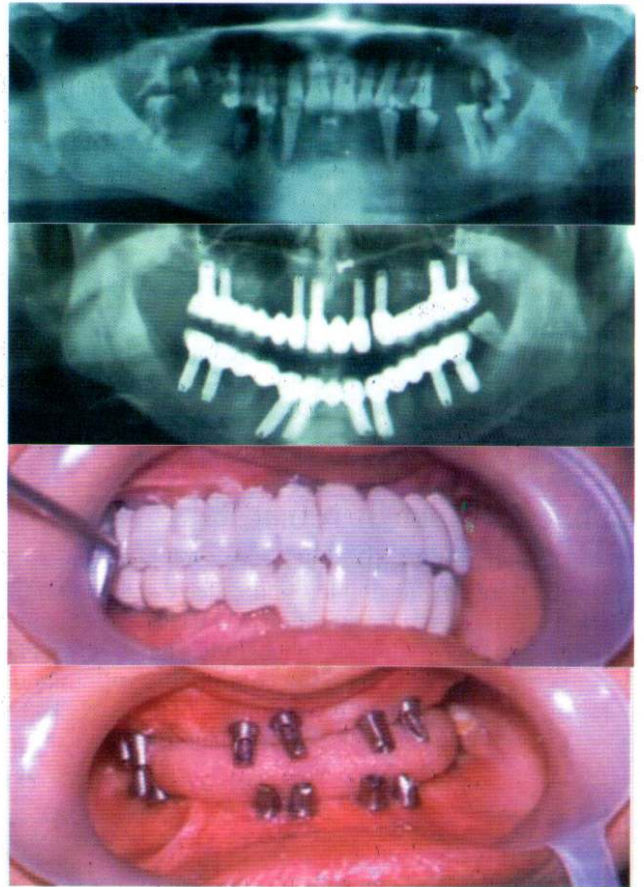


Figure 7: Full mouth rehabilitation with implants.



Figure 8: Rehabilitation with implant supported overdentures.

## NON-TREATMENT

After all treatment options have been evaluated, it is necessary to evaluate them against the possibility of providing no treatment. The cost of each treatment must be considered relative to the benefit of treatment and to the risks of non-treatment. If the non-treatment risks are non significant, cost/benefit ratio of treatment must be attractive for treatment to be worthwhile.

In the absence of symptoms, is it imperative to treat every oral condition?

It may be reasonable to invoke a "Watchful waiting" type of approach. This is true only if the possible sequelae of the condition do not damage other teeth or the general health of the patient because it is unethical to leave active disease untreated.

## EVIDENCE BASED OUTCOME DATA

Data that quantify the costs and outcomes of treatments are now available. Studies have shown that for some patients, a simple restoration may be just as beneficial as more complex treatment. Other studies have shown that whereas more patients are more comfortable with implant retained prosthesis, a significant number of patients are still satisfied with conventional complete dentures.

## DETERMINING THE PROPER COURSE OF ACTION

The prosthodontist must present the possible treatment options along with the pros and cons of each treatment to the patient. There may be a greater financial incentive to select one type of treatment over other. Moreover, if one type of treatment is "in style", some dentists may feel an impetus to use it even when conventional treatment would work just as well for the patient. Dentist should disclose them to the patient. Despite all these considerations if dentist is still confused upon the treatment option then he should resort to reversible treatment first. In the event, the simple treatment does not result in patient satisfaction the more complex treatment can be instituted. The duty of the prosthodontist is to supply the patient with enough information to arrive at an informed decision about the most appropriate treatment.

## SUMMARY

1. Treatment planning is no longer simply a result of diagnosis.
2. An admission of many gaps in our knowledge which underscores the risks of making decisions beyond our existing database.
3. A readiness to dump excess baggage of traditional tenets in prosthodontic education.
4. A determination to remain skeptical and irreverent about the many dogmas cultivated by some clinicians on the teaching circuit.
5. Understanding of non-treatment in a case if unsuited to a patient.

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