Psychologic Outcomes in Implant Prosthodontics

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Consensus regarding outcomes of the treatment of tooth loss, especially the psychologic outcomes, is needed to guide discovery of best practices and enable a better understanding of patient management for this chronic condition. This paper presents the findings of the ORONet Psychological Working Group for prosthodontics and aims to identify psychologic outcomes with properties deemed critical to meet clinical trial and clinical practice needs for the future. References obtained using a PubMed/Medline search were reviewed for clinical outcomes measures of interest. Clinical outcomes measures were judged relative to the criteria of truth, discrimination, and feasibility. Of the psychologic outcome measures identified in this systematic review, only the OHIP-14 was thought to be suitable for use in general practice and multi-institutional outcome registries and clinical trials. Development of clinically useful psychologic outcomes for future use could benefit from developmental methods and tools outlined in the patient-related outcomes field of clinical care. *Int J Prosthodont 2013;26:429–434. doi: 10.11607/ijp.3403*

The psychologic impact of tooth loss is an individual patient-determined oral health–related phenomenon. Reports describe variable characteristics of this phenomenon in terms of patient coping challenges, a life transition requiring varying times to come to terms with the condition, an experience of profound negative impact on the lives of individuals, some of whom even appear to cope well with interventions, and a feeling that they were inadequately prepared by the profession for the effects their loss had on confidence, daily activities, and appearance.1–5

Insight into patient-specific issues that compel them to seek elective care for this chronic condition is a valuable pursuit for clinicians and researchers wishing to better understand how to improve patient health. Gaining such insight into the phenomenon is

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a process of measuring the impact tooth loss and its subsequent treatment has on the individual's life, as mediated through their expectations of normal oral health. The patient response may be characterized by a variety of patient-specific descriptors related to comfort, appearance, or function and the combined effect of these impacts on their socialization.

Attempts to measure patient perception in response to oral disease/conditions or its treatment has a long history, especially since the publication of an oral health status conceptual framework by Locker in 1988.[6] One historic challenge to greater application of such measures has been an overwhelming emphasis in research use and a lack of emphasis in clinical dental practice.[7,8] Current emphasis on patient-centered outcomes research[9] and the collection of patient-reported outcome measures (PROs) in clinical practice may help address this challenge.[10,11] This PRO emphasis will be important to prosthodontics, where appropriate management of tooth loss should address the individual patient-perceived impact in provision of care.

Consensus regarding outcomes of prosthodontic treatment of tooth loss, especially the psychologic outcomes, is needed to guide discovery of best practices and enable a better understanding of patient management for this chronic condition. However, issues regarding the subjectivity of many outcomes in the psychologic domain, as well as influences of international and cultural differences, make comparability of data for this domain problematic.

The present paper presents the findings of the ORONet (Oral Rehabilitation Outcomes Network) Psychological Working Group for prosthodontics and aims to identify psychologic outcomes with properties deemed critical to meet clinical trial and clinical practice needs for the future.

Materials and Methods

Over a period involving two international workshops (La Bretesche, France, 2008, and Banff, Canada, 2010), literature searches were accomplished as part of the ORONet outcomes identification process, a process guided by similar activities within the arthritis field under the name OMERACT (Outcome Measures in Arthritis Clinical Trials). The systematic review aimed to delineate all psychologic outcomes presented in the implant prosthodontic literature, to identify which outcomes met a specific set of criteria felt to be critical for clinical and research use, and to summarize those outcomes in a rank order.

The list of references obtained by the PubMed/Medline search was reviewed to determine which articles were potentially appropriate for identifying outcomes measures. These papers retrieved and reviewed for clinical outcomes measures of interest. The instruments for measuring psychologic outcomes were entered into a spreadsheet by category (satisfaction, chewing difficulty, patient preference, etc), and each of the outcome measures was judged relative to the OMERACT criteria of truth, discrimination, and feasibility. The Psychological Outcome Group summarized the papers contributing to the selected outcome(s) reviewed for presentation in ORONet group discussion. This discussion resulted in a group consensus regarding whether each of the clinical outcomes measures identified met the required criteria.

Search Strategy

The overall search was conducted in PubMed using the following search headings: "Dental Implants"[Mesh] AND "clinical" AND ("satisfaction" OR "esthetics" OR "confidence" OR "self image" OR "psychological") AND (("1995/01/01" [PDat]: "2009/12/31"[PDat]) AND (Humans[Mesh]) AND (English[lang])) AND "has abstract"[Filter] with a clinical trials limit. Individual articles were added based on a hand search for related articles. The intent was to identify all types of outcomes aimed at estimating psychologic effects of tooth loss managed by implant and conventional prosthodontic interventions in clinical settings.

Results

Search findings

A total of 356 abstracts were reviewed in 2008 (without "clinical trial" filter). Of that total, 264 abstracts were excluded and 92 were reviewed. The same search string with the "clinical trial" filter and the date modified for 2008/01/01 to 2009/12/31 yielded another 135 abstracts. Following abstract review, 94 were considered relevant for review. Of these, 65 were deemed appropriate for psychologic outcome consideration (an additional 9 not found in either search were also reviewed).

Considering both searches, the total search yield included 491 articles, the total number of abstracts reviewed was 166, and the total number of articles read for outcome data abstraction was also 166.

Variety of Outcome Terminology

Table 1 shows that among the articles reviewed, 23 different terms were used to describe the psychologic outcomes. The number of articles identified appeared

sufficient to create an exhaustive list of psychologic outcomes used in prosthodontics. The most frequent category, patient satisfaction, was three times more prevalent than the second most common category, chewing difficulty. Common terms were used across some categories and when grouped revealed satisfaction (68), patient (65), chewing (30), and comfort (15) as the most common themes.

Psychologic Outcome Characteristics

Instrument development characteristics. Most reports used custom-developed psychologic measures,[12,13] often with limited description of how they were developed,[14] and therefore offered no formal validation that the information achieved represented what was sought.[15,16] An important exception was the Oral Health Impact Profile (OHIP), a scaled index of the social impact associated with oral disorders.[17–19] Over the years this instrument has been modified and used all over the world for many languages. Additionally, it is unclear in the development of most of the instruments whether patients were involved in the identification of items for measurements, or if experts alone were involved.[20] Such a distinction is considered critically important for PRO validity.

Short-term measures. Use of an instrument to evaluate the impact of care for a condition such as tooth loss should capture the impact over time. Measurement intervals for the studies were seen to vary widely. Some studies obtained a single measure after treatment (not inappropriate for comparative purposes),[21] while others obtained multiple measures after treatment to compare with a baseline value, creating an opportunity to see change possibly related to the care provided.[22] Measuring the impact of tooth replacement over time allows the opportunity to see change associated with provided treatment and possible change over time—a feature important to management of chronic conditions such as tooth loss.[22–24]

Clinical condition. The preponderance of reports provided psychologic measures for edentulous conditions, with fewer reporting for single tooth[16,25–27] and the fewest for multiple teeth replacements.[15,28] Consequently, the entire spectrum of tooth loss distribution was not well represented in the literature that included a measure of the psychologic impact of tooth loss treatment.

Validity of the scope of outcome measured. As shown in Table 1, many psychologic outcome terms were used to describe what authors felt important to measure for patients receiving prostheses. Making sure that a chosen psychologic measure actually provides the entire scope of what is desired in a valid manner is important.[29] The most frequent outcome, patient satisfaction, is a "single dimension" psychologic outcome. It is common to focus on a subset of this single dimension, such as esthetic satisfaction. Both patient-reported[30] and observer-reported esthetic outcomes[31–33] are important. However, in

Table 1 Domain Category Description

Domain category descriptions		
Patient satisfaction	= 60	#1
Chewing difficulty	= 19	#2
Psychosocial	= 9	#3
Esthetics	= 9	#3
Chewing ability	= 8	#5
Phonetics	= 8	#5
Denture satisfaction	= 8	#5
Patient opinion	= 4	
Patient-centered outcome	= 1	
QOL	= 5	
Preference	= 5	
Appreciation	= 2	
Chewing comfort	= 3	
Eating comfort	= 3	
Perceived comfort	= 7	
Functional assessment	= 5	
Oral competence	= 2	
Social activities	= 1	
Relational and sexual activities	= 1	
Perceived postoperative complications	= 3	
Perceived discomfort due to treatment	= 2	
Ease of cleaning	= 5	
Rank		
Patient satisfaction	60	
Chewing difficulty	19	
Psychosocial, esthetics	18	61
Denture satisfaction, phonetics, chewing ability	24	
Group (common terms) rank		
Satisfaction: Patient, denture	68	
Patient: Satisfaction, opinion, -centered outcome	65	
Chewing: Difficulty, comfort, ability	30	
Comfort: Chewing, eating, perceived, dis(comfort) due to treatment	15	

QOL = quality of life.

addition to their limited scope, a lack of consensus regarding esthetic outcome limit the general use of these measures at this time.[34] If a measure that captures multiple dimensions of oral health status is desired, then measuring satisfaction alone would misrepresent what is desired. Relying on a single dimension outcome may not measure the true impact (positive or negative) of a clinical intervention.[19]

Special outcome applications. In head and neck oncology, many validated quality of life measurement instruments were developed (a list can be obtained from ORONET); however, these questionnaires were not considered applicable for discriminating effects of missing tooth rehabilitation, particularly since they were developed for more impaired patients with major surgical defects.[35]

Lack of Clinical Practice Use of Psychologic Outcomes

Research vs private practice utility. The goal of all clinical research should be to help impact health care. For prosthodontic care, helping our patients know what to expect from a chosen option of care, the benefits and harms associated with options, what they can do to improve their outcomes, and what they should seek from clinicians to optimize long-term outcomes all require discovery from multiple sources. One important but neglected source in prosthodontics is the clinical practice setting.[7] Given this fact, it is important to point out that all of the psychologic measures in the literature reviewed were obtained in settings and by processes not representative of clinical practice, where the primary focus is on patient care. As a consequence, the feasibility of using a psychologic instrument within a more typical practice setting was not adequately demonstrated for those reviewed.[11] It is the feasibility requirement that will allow more synthesis of data across clinical settings (practice and research), yet it is the feasibility requirement that is less time-tested and determines which of the valid measures can actually be applied.[36]

Also related to the research application, many studies focused on the question of treatment discrimination between prostheses. In psychology, validity and reliability were developed to support the ability to discriminate between states. This is quite different from measurement of change, referred to as sensitivity or responsiveness, which are important for evaluation of impacts on patient conditions, such as prosthetic treatment on patient-perceived impact of tooth loss.[36] While both are important, evaluation of change over time following care is a requirement for everyday clinicians providing care to allow judgment of appropriateness of care.[11,37]

Properties Important for Clinical and Research Use–OMERACT Filter

The goal of this review is to identify outcomes common in implant prosthodontics found to meet criteria important for use in clinical practice and clinical trial settings. The outcomes characteristics of validity (truth), reliability, and sensitivity to change (discrimination) are necessary and applicable for all formal evaluations. However, the characteristic that ensures an outcome is usable within the practical constraints of its intended setting (feasibility) has not been as well tested, yet is key for application to both clinical practice and research settings. The reason feasibility has not been tested is because outcomes in this review were used in research applications, often to discriminate aspects of care between intervention groups, and not in a clinical setting to evaluate modification of a baseline psychologic impact based on the care provided. Having been developed specifically for research application to inform procedural-based aspects of patient care, and faced with the same challenges found in similar medical fields,[38] feasibility is not a designed goal. Therefore, no outcome reviewed in the domain of psychologic outcomes met all requirements of the OMERACT filter.

The measure with characteristics closest to the requirements is the Oral Health Impact Profile-14 (OHIP-14), a 14-item questionnaire designed to measure self-reported functional limitation, discomfort, and disability attributed to oral conditions.[18] It is derived from an extended version of 49 items[17] based on a theoretical model developed by the World Health Organization (WHO)[39] and adapted for oral health by Locker.[6] The model links the consequences of oral disease from a biologic level of impairment to a behavioral level of functional limitation, discomfort, and disability and ultimately to a social level of handicap. The OHIP-14 has been shown to be reliable,[18] to be sensitive to changes,[19,40] and to have adequate cross-cultural consistency.[41]

Discussion

Oral health care for missing teeth is largely elective. This suggests that individuals with missing teeth who seek care as patients notice an impact on their oral health experience and at a point in time judge that impact as detracting from a sense of well-being. These patients present with expectations that care will impact them in a positive way. How adequately

clinicians meet their expectations is a patient-specific determination.

Identifying patient-specific information in a clinical setting demands use of a measure that is feasible in practice. In this context, feasibility takes into account constraints of time, money, and interpretability in a clinical setting. This criterion addresses the pragmatic reality of use of measures, one that may be decisive in determining a measure's success and one that has been inadequately researched at this point in time in dentistry.[7]

The literature reviewed demonstrated a wide variety of categories felt to relate to an adequate understanding of psychologic outcomes in prosthodontics. The most consistent themes appropriately involved a focus on the satisfaction of the patient relative to function and comfort. Whether these themes, commonly derived from expert development, capture all of the items important to patients with missing teeth is important to clarify in choosing an instrument for widespread use. Certainly, contribution from a patient-centered perspective in instrument development is recognized as most important.[42]

The focus on patient-related outcomes use in clinical care settings is noteworthy for its individual patient emphasis.[43,44] The rationale stems from recognition that an individual's disease or condition does not exist separate from their personal and social context; therefore, understanding this patient-specific context informs various aspects regarding patient management. This information can facilitate focused communication, prioritize patient-perceived problems, identify preferences, and allow monitoring of changes or responses to intervention. Such individualized measures should be designed to detect patient problems in a manner that is more clinically meaningful, allows for shared decision making, identifies patient priorities for care, and facilitates setting realistic management objectives.[43]

A novel approach for formalizing a process for gaining specific patient information while also recognizing the constraints of clinical utility was proposed by Sloan et al.[45] The method guides meaningful discussion by first seeking a "gestalt" response, since the precise pattern of impact gleaned with more detailed query is less important than the patient's perception that there has been an impact, followed by further discussion. The level of detail of the instruments is targeted to identify those areas of concern that should stimulate further investigation, and the items are intended to stand alone to serve as clinical practice facilitators.[46] This approach requires that instruments be shorter than the more detailed instruments currently available.

Conclusion

Psychologic outcomes associated with management of missing teeth have been measured in a variety of ways for some, but not all, missing tooth conditions since the 1980s. Most measures have occurred in research work with little attention to the value of such measures in clinical practice.

The most useful measures for future work in both clinical practice and clinical trial applications should satisfy the critical qualitative measure criteria of truth, discrimination, and feasibility. Of the psychologic outcomes identified in this systematic review, only the OHIP-14 was found to be suitable. Development of clinically useful psychologic outcomes for future use could benefit from developmental methods and tools outlined in the PRO field of clinical care.

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