Original article

A multi-centered epidemiological study evaluating the reliability of the treatment difficulty indices developed by the Japan Prosthodontic Society

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Abstract

Background: The diagnostic assessment of the level of difficulty in treating patients who need prosthodontic care is useful to establish a medico-economically efficient system with primary care dentists and prosthodontic specialists.

Materials and methods: A multi-axis assessment protocol was established using the newly established treatment difficulty indices. The protocol contains Axis I: oral physiological conditions (e.g., teeth damage and/or missing teeth); Axis II: general health and sociological conditions (e.g., medical disorders); Axis III: oral health-related quality of life (OHRQOL; e.g., oral health impact profile: OHIP); and Axis IV: psychological health (e.g., mood, anxiety, somatoform disorders). A preliminary study on the test–retest consistency of the protocol was conducted to check the levels of reliability of the indices prior to a large-scale, multi-center cohort study on the validity of the protocol.

Results: The test–retest consistency in terms of the oral physiological condition (Axis I) after data reduction was 0.63 for patients with teeth problems, 0.95 for partially edentulous patients, and 0.62 for edentulous patients. The reliability for general health and sociological conditions (Axis II), OHRQOL (Axis III), and psychological health (Axis IV) were 0.88, 0.74, and 0.61, respectively. These values reflect either "sufficient agreement" or "excellent agreement" in accordance with the criteria established by Landis and Koch (1977) [1].

Conclusion: This protocol is the first multi-axis assessment scheme introduced for prosthodontic treatment with sufficient reliability. This new system is therefore expected to have a significant impact on future dental diagnostic nomenclature systems.
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Keywords: Diagnosis; Prosthodontics; Quality assurance; Treatment outcome; Patient risk profile

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1. Introduction

The approach to dental treatment has changed from care focusing on the oral cavity to holistic care [2], which is reasonable considering the relationships between periodontal diseases and diabetes [3,4], oral care and aspiration pneumonia [5,6], cerebral infarction and swallowing disorders [7], as well as psychological problems and orofacial pain [8]. Therefore, patients who need prosthodontic care may not only have problems with their oral characteristics, which are considered to be a physical condition, but also with their general and psychological health as well as environmental factors. In addition, dentists are required to perform multidisciplinary (multi-axis) care and multiple diagnoses, including those of general and psychological health rather than just focusing only on conventional prosthodontic rehabilitation.

Furthermore, a paradigm shift has been established from a doctor/disease-oriented system to a patient/problem-oriented system. Consequently, the significance of patient-based outcomes, with the identification of the specific individual needs for each patient has thus been highlighted. Nevertheless, there is a lack of a systematic methodology or approach, or even any guidelines that enable the dentist to evaluate this individual variation and determine the appropriate prosthodontic treatment. In addition, there are no diagnostic criteria that include all these intercorrelated factors, and therefore the risk factors that may affect the results of prosthodontics care have not yet been fully identified. Therefore, continued inefficiency exists in terms of dental education, research as well as healthcare costs due to the lack of differentiation between cases for which treatment is difficult and those for which conventional treatment is appropriate.

The American College of Prosthodontists (ACP) developed a classification system for the partially edentulous and those with tooth problems based on diagnostic findings [9,10]. The ACP aimed to establish systemic diagnostic criteria for the partially edentulous and those with teeth problems by using the comprehensive results of evaluation of the following four oral conditions: 1. The location and pattern of edentulism, 2. condition of any abutment teeth, 3. occlusion, and 4. characteristics of the residual ridge. This approach is critical in the prosthodontic field because it is the first attempt to establish diagnostic criteria as well as dental treatment based on an overall evaluation of the whole oral cavity. However, it does not include items related to the patient's general physiological and psychological health. In other words, this classification system is limited to the patient's oral physiological conditions, and it does not evaluate the patient's needs from a multi-disciplinary perspective.

The Japan Prosthodontic Society (JPS) has systematized the clinical examinations and performed multi-axis assessment of complex variations in patients who need prosthodontic care in response to this current demand for such holistic approaches. The objectives for the development of the multi-axis assessment protocol on the treatment difficulty indices for prosthodontic care are as follows: (1) establishment of the prosthodontic diagnosis based on clinical evidence, (2)

identification of the holistic risk factors specific to prosthodontic care, such as general health/social problems, and psychological problems of patients, (3) the application of patient-based outcomes to measure the effectiveness of various prosthodontic treatment options, and (4) the utilization of a multi-axis assessment style.

This report introduces the newly developed "multi-axis assessment protocol with treatment difficulty indices for prosthodontic care" and describes the results of a multi-centered clinical study on test–retest consistency conducted in major prosthodontics research centers in Japan.

2. Multi-axis assessment protocol to measure treatment difficulty in prosthodontic care

2.1. Development of the multi-axis assessment protocol to measure treatment difficulty

The concept of treatment difficulty was defined as "it required more medical resources (time, money, human) to improve his/her oral health related QOL (OHRQOL) to the level required by the patient".

The system of this multi-axis assessment protocol on the treatment difficulty indices for prosthodontic care utilizes *four* axes, including Axis I: oral physiological conditions, Axis II: general physiological health and sociological conditions, Axis III: OHRQOL, and Axis IV: psychological health of the patients [8,11]. The first edition (ver. 1.04) was introduced after the Ad Hoc Committee for Clinical Guidelines for Prosthodontic Management of the JPS prepared the draft and obtained opinions from JPS board members and affiliates.

2.2. Structure of the multi-axis assessment protocol

The study protocol is made up of a clinical examination form and a questionnaire ([12]; Appendices 1–7). The clinical examination form was completed by a dentist in charge or a research coordinator at each institution, and the questionnaire was filled out by the patients.

2.2.1. Questionnaire for patients
2.2.1.1. Primary patient data. The questionnaire consisted of several questions asking the name of the associated institution, identification number, date of entry, among others in order to remain anonymous while still enabling information on the individual's context to be obtained. This part of the questionnaire was filled out by the dentist in charge or a research coordinator before the questionnaire was distributed to the patients.

2.2.1.2. OHRQOL (Appendix 5). This study used the Japanese version of the OHIP (OHIP-J54 [13]). The OHIP-J54 was produced by the following steps: Oral Health Impact Profile by Slade et al. [14] was translated into Japanese and revised by Japanese dentists, and then translated back to English and proofread (OHIP-J49). Five new items related to temporomandibular joint dysfunction and others were added