

# Decision Support System for Selection of Abutment Tooth Used for Attachment in Removable Partial Dentures

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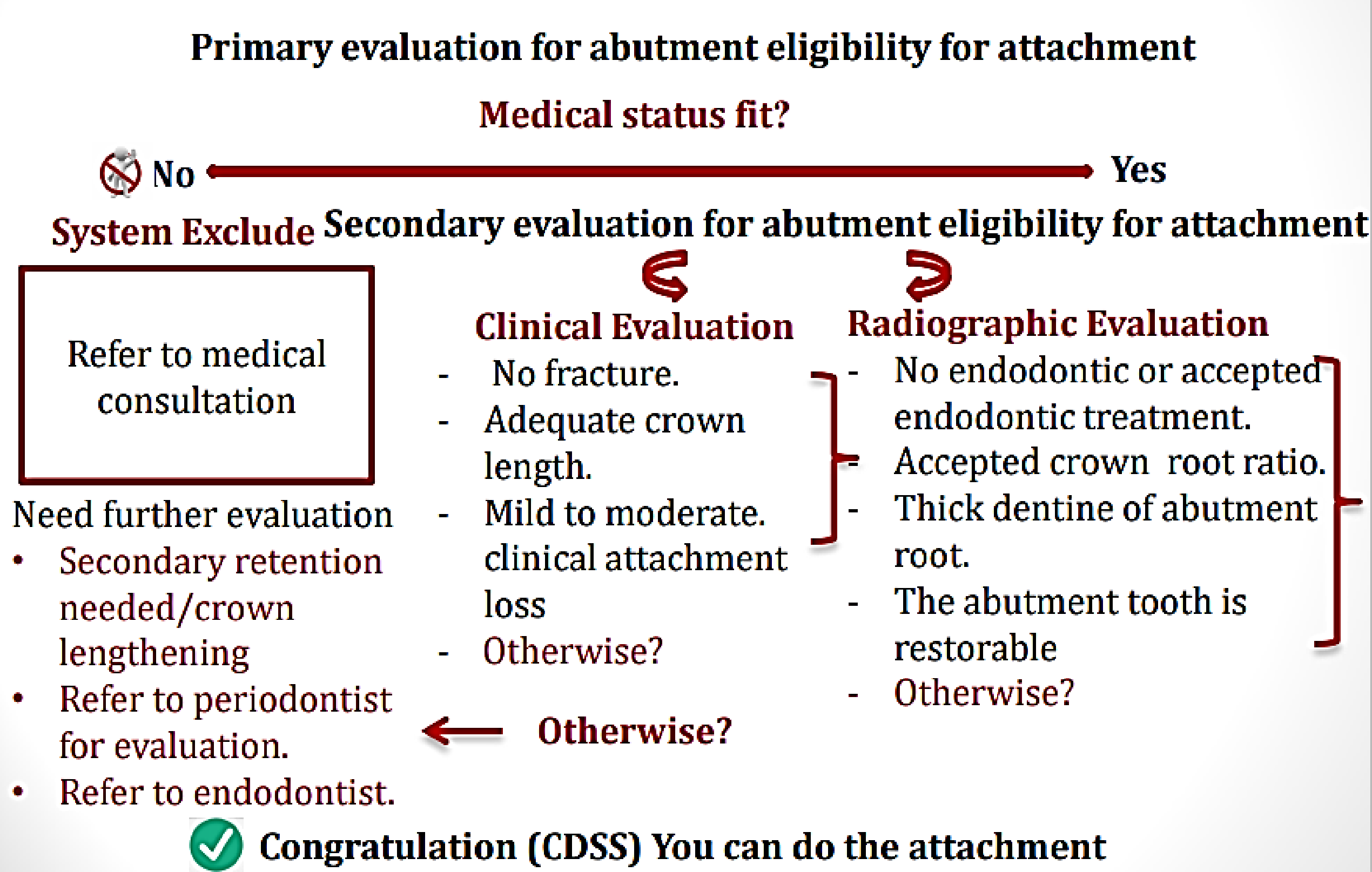
## INTRODUCTION

In clinical decision-making, dentists have diverse views regarding the selection criteria for abutment teeth used for attachments in removable partial dentures (RPD). Many factors influence abutment tooth selection which is challenging for inexperienced practitioners and dental students. There are many criteria for abutment teeth selection for attachments in removable partial dentures. Many studies have been published concerning these complexities and clinical factors that influence the abutment teeth' prognosis. Therefore, using the Dental Decision Support System (DDSS) aids in this decision-making process; it creates an exceedingly effective inference engine that analyzes these issues and helps resolve them. Such issues concern all dental procedures such as Endodontics, Oral Surgery, Periodontics, and patient health. Due to a lack of knowledge and experience, errors occur with concomitant failure. This system provides significant benefits in reducing errors, helping increase the confidence in abutment selection, and improving patient satisfaction.

## METHODS & MATERIAL

DDSS is based on 58 rules that improve care quality and can be dynamically adjusted in future studies. Once the system is designed and improved, the system should be validated to be recognized online. The validation of the system declares that the system was established correctly. All related factors and rules are introduced into the system. The validation of the system was done by questionnaires designed to be answered by experienced prosthodontists, who can suggest new ideas and recommendations to enhance system validation. The responses were collected from 31 experts at Rutgers School of Dental Medicine, New York University College of Dentistry, and some private dental clinics in both New Jersey and New York states. The responses were scaled by a 5-point scale from "highly agree" to "highly disagree." Cronbach's Alpha and Pearson Correlation Coefficient tests in the SPSS were used to measure the system's reliability by analyzing the answers to questionnaires.

### Flow Diagram Illustrates the Important Points for Dental Decision support System



## Results

The system was successfully developed and improved using experts' ideas, suggestions, and evidence-based dentistry. Questionnaire validation was dispersed to 50 expert prosthodontics. 31 of them responded to the questions according to the guidelines and clinical scenarios.

The experts filled out the questionnaire about their agreement with the system's rules and provided a valued opinion to develop the system. The prosthodontists' responses are according to the Likert scale. IBM® SPSS Statistics software was used to analyze the questionnaire responses.

## RESULTS

The results of the questionnaires were analyzed by using Cronbach's Alpha Coefficient. This test is used to measure the reliability of system validation by analyzing the questionnaires. Cronbach's Alpha is the standard measure of internal consistency ("reliability"). It is most commonly used when there are multiple questions in a survey/ questionnaire that form a scale and need to determine if the scale is reliable. The scale for interpretation of Cronbach's Alpha Coefficient is shown in the table. The Cronbach's Alpha Coefficient for the validation questionnaire is 0.918, which signifies the excellent internal consistency of the questionnaire items [24]. The questionnaire displayed that all prosthodontists agreed with the necessity to develop the system for an abutment selection in AR-RPD.

Reliability Statistics

Cronbach's Alpha	N of Items
.918	10

## CONCLUSION

In conclusion, with DDSS, there will be no subjectivity in making optimal treatment plans. Prosthodontist experts agreed that the system could be efficiently valuable for training dental students, new dentists, and residents to select a suitable abutment tooth for AR-RPD. Therefore, it has been shown that a system is a valuable tool for innovative dentists and dental students.

Future consideration should be made to use this system in other complex dental fields to increase its implementation rate among dentists and extend its application use. Efforts should be made to engage the system in the dental academic syllabus. A randomized clinical trial is also required to explore the system's effectiveness by providing precise recommendations and comparing clinicians who use and who do not use the system.

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