Original Article

Differential Diagnosis between Chronic versus Aggressive Periodontitis and Staging of Aggressive Periodontitis: A Cross-sectional Study

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Abstract

Background: Differentiating between chronic periodontitis (CP) and aggressive periodontitis (AgP) is challenging. The aim of this study was to assess the variations in diagnosis between CP versus AgP and the staging of AgP based on the disease-staging index for AgP among periodontists, specialists in oral medicine, and general dental practitioners (GDPs). **Materials and Methods:** Fifteen cases diagnosed as either CP or AgP were included in a "case document" and sent electronically to 75 respondents. Case document included a detailed history with periodontal charting, clinical features, images, and radiographs for all the cases. Diagnosis and staging for the case (if diagnosed as AgP) were requested. A reordered case document (cases in a different sequence) was again sent to respondents after a gap of 1 month. Statistical analysis: Descriptive statistics including frequency and percentage were calculated. Pearson's Chi-square test was used to analyze the data collected. **Results:** For the "case document," 10.17% of the responses were different from those of the authors for diagnosis, whereas 4.48% of the responses were different from those of the authors for the staging of AgP. The agreement in the overall responses was in the range of 0.69–0.84, which was considered good. Comparison of the responses for diagnosis showed statistically significant (P = 0.009) difference between specialists in oral medicine and GDPs. **Conclusions:** Variations exist among respondents regarding the diagnosis of CP versus AgP. Staging of AgP based on the listed criteria showed low variations.

Keywords: *Aggressive periodontitis, chronic periodontitis, diagnosis, staging, variations*

Introduction

Periodontitis is a microbially driven host-mediated slowly progressive destructive disease of the periodontium.[1] Chronic periodontitis (CP) cases usually have abundance of plaque and calculus, which match with the amount of periodontal destruction.[1] On the other hand, aggressive periodontitis (AgP) is characterized by rapid rate of disease progression, absence of any systemic involvement, and familial aggregation of cases.[2] There is usually a mismatch between the amount of local factors and the periodontal destruction.[2] Prevalence of AgP ranges from 0.5% to 2.5%,[3] whereas prevalence of CP ranges from 30% to 60% in different populations.[4] AgP has been subclassified into localized and generalized based on the extent.[5] However, a classification for AgP, based on severity, does not exist as of now.[6] We have recently proposed a disease-staging index for AgP based on severity and certain specific clinical and radiographic features.[7] This staging follows the natural progression of the disease and can be used as a baseline reference to assess the progression of the disease to formulate a broad treatment plan and prognosticate the cases.[7]

General dental practitioners (GDPs) usually screen patients and should detect and classify periodontal diseases. Specific subclassifications are then given by periodontists and less frequently by specialists in oral medicine. However, differentiating between the cases of CP and AgP might be challenging to clinicians, as there is considerable overlap between these two types of periodontal diseases.[1] Therefore, the aim of this cross-sectional study was to assess the variations in diagnosis between CP versus AgP among periodontists, specialists in oral medicine, and GDPs (respondents). We also aimed to assess the validity of the AgP-staging index based on interindividual variations in staging and on quantitative and qualitative feedback by respondents.

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Materials and Methods

Ethical approval for the study was obtained from the institutional review board, SEGi University.

Sample size

A minimum of 45 responses was needed for the present study to achieve 0.9 sample agreement between two raters with population agreement 0.5% and 40% prevalence of CP at 5% risk and 90% power. For convenience and to balance for the heterogeneity of subspecialization among participating dentists, the case document was sent to 75 respondents (25 in each group: Group (i) specialists in periodontology, Group (ii) specialists in oral medicine, and Group (iii) GDPs.)

Respondents

All respondents were either academicians cum clinicians or private practitioners who were willing to respond to the case documents. Respondents constituted three groups as follows: (i) specialists in periodontology, (ii) specialists in oral medicine, and (iii) GDPs. Specialists in periodontology and oral medicine were registered specialists in their country of practice after a 3-year clinical master's program in their respective specialty following their bachelor's dental degree. GDPs were registered dentists practicing either in ministry clinics or in private practices. Respondents were not provided with any financial benefits/incentives for their participation. Individuals who were not interested to participate in the study were excluded from the study.

Preparation of the "case document"

Two periodontists (SSR and VVG) selected 15 cases of periodontal disease patients from Faculty of Dentistry, SEGi University, out of which ten were diagnosed as generalized AgP and five as generalized CP. Diagnosis of cases was based on the American Academy of Periodontology Task Force Report on the Update to the 1999 Classification of Periodontal Diseases and Conditions.[8] Systemically, healthy patients with positive family history for periodontal disease and rapid loss of attachment in three permanent teeth other than first molars and incisors were considered as generalized AgP.[8] Younger than 25 years at the time of disease onset and relatively low levels of biofilm and secondary etiology (calculus) were used as additional criteria during diagnosis of AgP.[8] Occurrence of a significant amount of periodontal destruction with minimal deposits in especially young patients (<35 years old) was considered as "rapid" loss of attachment.[9] Cases with abundance of plaque and calculus with probing pocket depths of >4 mm and with loss of attachment in >30% of the sites and not fitting the AgP criteria were categorized as generalized CP.[8] Cases diagnosed as periodontitis as a manifestation of systemic disease, patients with diabetes mellitus, and patients with mixed dentition were excluded from the study. Cases diagnosed as AgP were further subclassified into three stages based on the disease-staging index for AgP.[7] The criteria for staging of AgP are listed in Figure 1. The initial portion of the case document provided details to the respondents about keying in their responses [Figure 1]. Among the AgP cases, one was classified as Stage I, five were Stage II, and four were Stage III by authors SSR and VVG. Any differences in opinion regarding the diagnosis of cases and staging of AgP were resolved by a third senior experienced periodontist (DSM). A "case document" was prepared by authors SSR and VVG containing a detailed history, clinical images, and radiographs (orthopantomographs) for each of these 15 cases. Detailed history included age, gender, medical history, smoking status of the patient, periodontal charting, main characteristic clinical features, and radiographic features. The case document prepared was further vetted by an experienced periodontist (LN). Sample cases of CP, Stage I, Stage II and Stage III of AgP listed in the "case document" are shown in [Figures 2-5].

This "case document" was electronically sent to a total of 75 respondents which included periodontists, specialists in oral medicine, and GDPs (25 each). The respondents were requested to diagnose the cases as either CP or AgP and to key in their responses in the space provided (blue arrow in Figure 2). In case of diagnosis being AgP, respondents were requested to further stage the cases into one of the three stages based on the criteria provided and key in their response for staging in the space provided (yellow arrow in Figure 2). One-month time was provided for the respondents to respond to the "case document." We received a total of 58 (77.3%) responses that included 20 responses from periodontists (80.0%), 18 responses from oral medicine specialists (72.0%), and 20 responses from GDPs (80.0%). The same cases were reordered in a different sequence by one of the authors (VVG) and were named as "reordered case document."

This "reordered case document" also included a survey questionnaire containing 8 questions pertaining to the listed criteria for staging of AgP. The questions were framed related to the staging of AgP based on the ideal qualities of an acceptable index.[10] Figures 6 and 7 show the questionnaire included with the "reordered case document." Respondents were requested to provide their feedback on a Likert scale of 0–10, assuming 0 to be the lowest score and 10 to be the highest score.[11] Open-ended questions were also included to obtain any suggestions for improvement of staging AgP based on the ideal qualities of an acceptable index.[10] This "reordered case document" was sent electronically to those who had responded to the "case document" after a gap of 30 days. A period of 1 month was provided to respond to the "reordered case document" and the questionnaire. The study was carried out from December 2016 to March 2017.

Variations in diagnosis of chronic versus aggressive periodontitis and in staging of aggressive periodontitis among periodontists, specialists in oral medicine and general dental practitioners.

This document contains 15 cases which are either chronic periodontitis or aggressive periodontitis. Each case has been supplied with brief history, clinical images and radiographs. Based on the provided history, clinical images and radiographs, you are requested to diagnose the case as either chronic periodontitis (CP) or aggressive periodontitis (AgP) and write your diagnosis in the column provided.

If your diagnosis is chronic periodontitis, move to the next case. If your diagnosis is aggressive periodontitis, Please stage the aggressive periodontitis case into one of the three stages, based on the criteria given below.

Salient features of the Disease Staging for Aggressive Periodontitis

Stages	Main Clinical and Radiological Features	Other Common Features
Stage I	At least 2 sites with CAL >5mm, Radiographic bone loss <50%	No teeth lost due to periodontal disease Prevalently shallow vertical bony defects compared to horizontal bone defects
Stage II	At least 2 sites with CAL > 6mm ; Maximum radiographic bone loss: 50-70%	Pathologic tooth migration, especially of anterior teeth with concomitant diastema formation. Upto three teeth lost due to periodontal disease or upto three teeth with hopeless prognosis. Combination of angular defects and horizontal defects (cases of localized AgP may have classical mirror image appearance)
Stage III	At least 2 sites with CAL >8mm Radiographic bone loss more than 70%	Pathologic tooth migration leading to crowding and extrusion of the involved teeth. Loss of vitality of some teeth (secondary endodontic involvement), Pattern of bone destruction prevalently horizontal More than three teeth lost due to periodontal disease or more than three teeth having hopeless prognosis

Figure 1: Image shows the information provided to respondents for diagnosing cases provided in the case document. It also lists the criteria for disease-staging index for aggressive periodontitis

CASE 4: Age: 45; Gender: Female; Medical and family history is non-contributory; Abundance of plaque and calculus deposits throughout the mouth. Patient is non-smoker.	Staging (only if your diagnosis is AgP, please stage the case)
Write your diagnosis here	Write your staging here

Main Clinical & Radiological Features seen in the case	Other Common Features seen in the case
➢ At least two sites with clinical attachment loss ➢ Generalized deep periodontal pockets ➢ Bone loss more than 70%	✓ Generalized horizontal bone loss ✓ Two teeth already lost to periodontal disease ✓ Eight teeth having hopeless prognosis ✓ Disto-labial migration of all the anterior teeth.

Figure 2: A sample case of chronic periodontitis included in the "case document" providing history, clinical notes, clinical images, and radiographs of the case. Blue arrow points to the slot for diagnosis for the case. Yellow arrow points to the slot for staging in the case diagnosis is aggressive periodontitis

Statistical analysis

Responses gathered were analyzed to calculate the variations in diagnosis between CP and AgP and variations in staging of AgP. Data obtained were entered in MS Excel spreadsheet, and STATA/MP-13 software was used for the analyses. Descriptive statistics including frequency and percentage were calculated. Pearson's Chi-square test was used to analyze the data collected. For comparison of

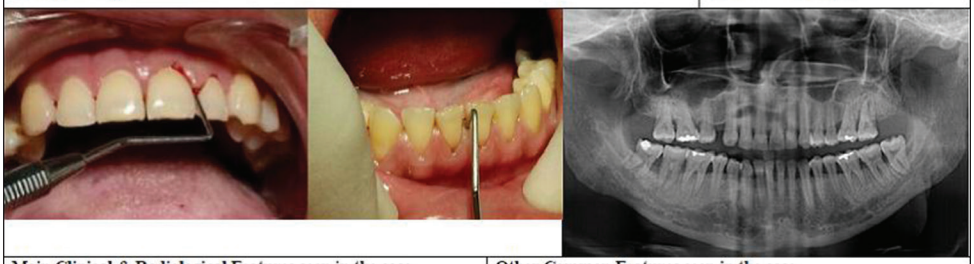
SAMPLE OF BRIEF HISTORY, CASE NOTES, CLINICAL IMAGE AND RADIOGRAPH OF A CASE OF STAGE I AGGRESSIVE PERIODONTITIS	
CASE 15: Age: 28; Gender: Female; Medical history is non-contributory; Family history is positive; Minimal amounts of plaque is noticed. Patient is non-smoker.	STAGING (only if your diagnosis is AgP, Please stage the case)
Write your Diagnosis here:	Write Your Staging here:
	
Main Clinical & Radiological Features seen in the case	**Other Common Features seen in the case**
➢ Generalized deep periodontal pockets ➢ Bone loss less than 50 %	➢ Vertical bone defects around maxillary 1st molars ➢ Diastema formation seen in mandibular anteriors

Figure 3: A sample case of Stage I aggressive periodontitis listed in the "case document" providing history, clinical notes, clinical images, and radiographs of the case

CASE 1: Age: 18 years; Gender: female; Medical history is non-contributory; Family history is positive; Non-smoker. Gingival enlargement is also noticed with calculus accumulation in lower anterior teeth	STAGING (only if your diagnosis is AgP, Please stage the case)
WRITE YOUR DIAGNOSIS HERE:	WRITE YOUR STAGING HERE:
	
Main Clinical & Radiological Features seen in the case	**Other Common Features seen in the case**
➢ At least two sites with clinical attachment loss more than 6mm ➢ Bone loss between 50-70%	➢ Pathologic tooth migration, especially of anterior teeth with concomitant diastema formation. ➢ No teeth lost. ➢ Combination of angular defects and horizontal defects
"Reproduced from Dental Update (ISSN 0305-5000), by permission of George Warman Publications (UK) Ltd"	

Figure 4: A sample case of Stage II aggressive periodontitis listed in the "case document" providing history, clinical notes, clinical images, and radiographs of the case. Images reproduced from Dental Update (ISSN 0305-5000), by permission of George Warman Publications (UK) Ltd

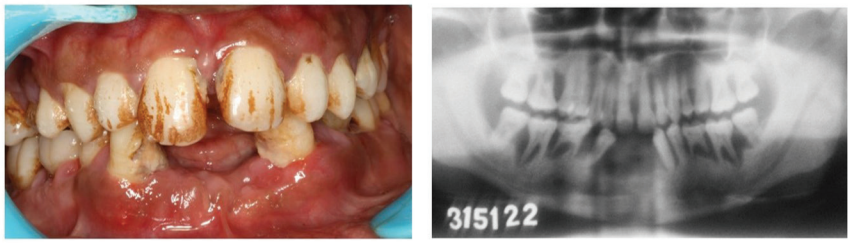
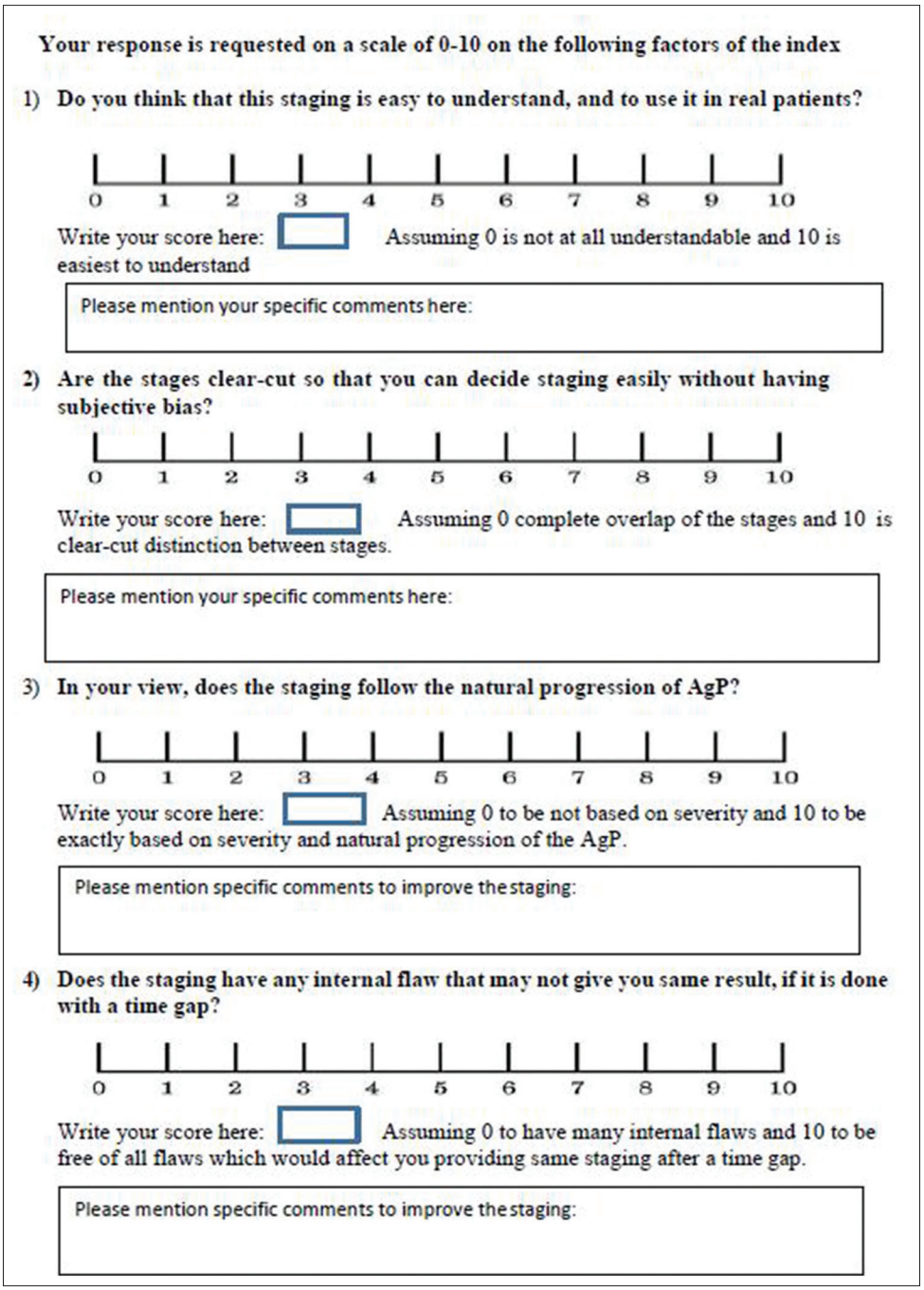
CASE 5: Age: 30 yrs old; Gender: Male; Local factors seen on the lingual surface of the teeth. Medical history is non-contributory; Family history is positive; Smoking history: negative	STAGING (only if your diagnosis is AgP, Please stage the case)
WRITE YOUR DIAGNOSIS HERE:	WRITE YOUR STAGING HERE:
	
Main Clinical & Radiological Features seen in the case	**Other Common Features seen in the case**
➢ More than two sites with CAL more than 8 mm ➢ Bone loss more than 70%	➢ Distolabial migration with concomitant diastema formation ➢ More than 3 teeth lost due to periodontal disease ➢ Loss of vitality of teeth resulting in secondary endodontic involvement due to primary periodontal pocketing.

Figure 5: A sample case of Stage III aggressive periodontitis listed in the "case document" providing history, clinical notes, clinical images, and radiographs of the case



Your response is requested on a scale of 0-10 on the following factors of the index

1) **Do you think that this staging is easy to understand, and to use it in real patients?**

0 1 2 3 4 5 6 7 8 9 10

Write your score here: ☐ Assuming 0 is not at all understandable and 10 is easiest to understand

Please mention your specific comments here:

2) **Are the stages clear-cut so that you can decide staging easily without having subjective bias?**

0 1 2 3 4 5 6 7 8 9 10

Write your score here: ☐ Assuming 0 complete overlap of the stages and 10 is clear-cut distinction between stages.

Please mention your specific comments here:

3) **In your view, does the staging follow the natural progression of AgP?**

0 1 2 3 4 5 6 7 8 9 10

Write your score here: ☐ Assuming 0 to be not based on severity and 10 to be exactly based on severity and natural progression of the AgP.

Please mention specific comments to improve the staging:

4) **Does the staging have any internal flaw that may not give you same result, if it is done with a time gap?**

0 1 2 3 4 5 6 7 8 9 10

Write your score here: ☐ Assuming 0 to have many internal flaws and 10 to be free of all flaws which would affect you providing same staging after a time gap.

Please mention specific comments to improve the staging:

Figure 6: Image shows the questionnaire (page 1) requesting for qualitative and quantitative responses regarding the disease-staging index for aggressive periodontitis based on the ideal qualities of an acceptable index

responses among three groups, *Z*-test for proportion was used. The *"P"* value set for the study was 0.05.

Results

Responses for the case document

Analysis of the responses for the "case document" (first round) revealed that 10.17% (89 out of 870 responses) were different from the diagnosis given by the authors and 4.48% (26 out of 580 responses) were different from the staging given by the authors. Among periodontists, 9.67% of the responses (29 out of 300) were different from the diagnosis given by the authors, whereas 4% (8 out of 200) of the responses were different from the staging given by the authors. Around 7% of the responses (19 out of 272) from specialists in oral medicine were different from the diagnosis given by the authors, whereas 4.5% of responses (8 out of 182) were different from the staging given by the authors. Among GDPs, 13.67% of responses (41 out of 300) were different from the diagnosis given by the authors, whereas 5% of the responses (10 out of 200) were different from the staging given by

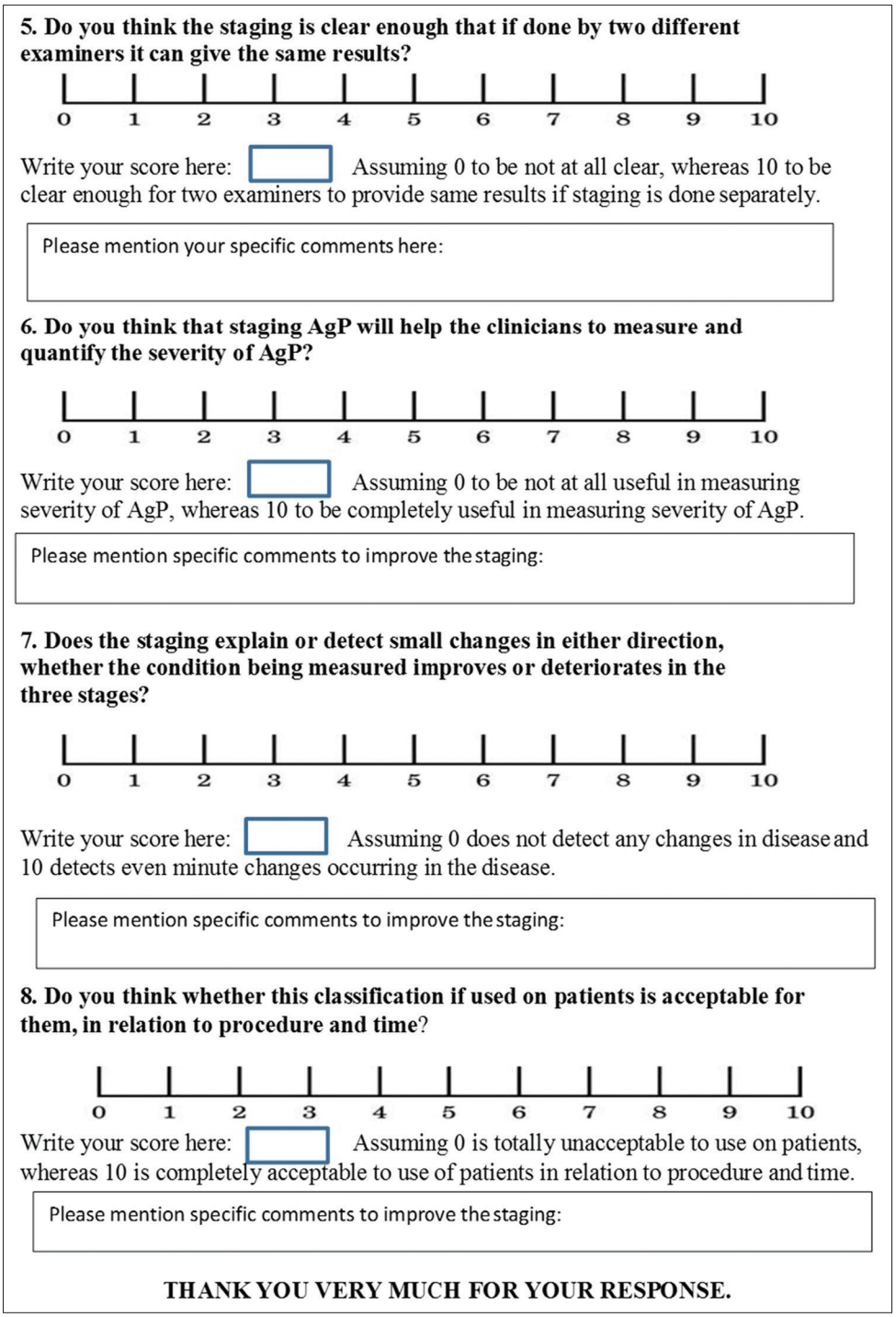


Figure 7: Image shows the questionnaire (page 2) requesting for qualitative and quantitative responses regarding the disease-staging index for aggressive periodontitis based on the ideal qualities of an acceptable index

the authors. Comparison of the responses for staging of AgP showed no significant differences between any of the groups. Comparison of the responses for diagnosis showed differences between specialists in oral medicine and GDPs, which was statistically significant ($P = 0.009$). Comparison of the responses for diagnosis showed differences between periodontists and GDPs; however, this difference was not statistically significant ($P = 0.126$). Table 1 shows the comparison of responses among the three groups using *Z*-test for proportion [Table 1].

Responses for the reordered case document

The response rate for the reordered case document was 95% (19 out of 20) for periodontists, 94.5% (17 out of 20) for specialists in oral medicine, and 90% (17 out of 18) for GDPs. Analysis of the responses for the "reordered case

document" (second round) revealed that 11.85% (96 out of 810 responses) were different from the diagnosis given by the authors. In 4 out of 15 cases, diagnosis/staging was different from first- and second-time answers. Around 3.89% (21 out of 540) of the responses were different from the staging given by the authors. Among periodontists, 11.58% of the responses (33 out of 285) were different from the diagnosis given by the authors, whereas 5.26% (10 out of 190) of the responses were different from the staging given by the authors. Around 9% of the responses (23 out of 255) from specialists in oral medicine were different from the diagnosis given by the authors, whereas 4.7% of the responses (8 out of 170) were different from the staging given by the authors. Among GDPs, 14.82% of the responses (40 out of 270) were different from the diagnosis given by the authors, whereas 1.67% of the responses (3 out of 180) were different from the staging given by the authors. Comparison of the responses for staging of AgP in the reordered case document also showed no significant differences between any of the groups. Comparison of the responses for diagnosis showed differences between specialists in oral medicine and GDPs, which was statistically significant (P = 0.039). Table 1 shows the comparison of responses between periodontists, specialists in oral medicine, and GDPs using Z-test for proportion.

Variations in the overall responses between periodontists, specialists in oral medicine, and GDPs was evaluated using kappa scores which were in the range of 0.69–0.84 which are considered good. There was no statistically significant difference of interexaminer and intraexaminer kappa scores between periodontists, specialists in oral medicine, and GDPs. The summary of the interexaminer and intraexaminer kappa scores is listed in Table 2.

Analysis of Variance (ANOVA) of the quantitative responses showed a good agreement to the questions posed in the questionnaire. Few of the notable qualitative responses to improve the staging index of AgP were inclusion of smoking as a parameter, component of family history, and quantification of plaque. Possibility of adding a method for assessing the percentage of bone loss was suggested. One of the respondents highlighted the possibility of bias during staging as it is dependent on the evaluation of prognosis, which itself (prognosis) is biased. The respondents identified that easier understanding of the stage of the disease and the possible need for more complex treatments with increasing severity of the disease by patients would be the main advantages of the staging index.

Discussion

Diagnosis of any disease assumes paramount importance in both Medicine and Dentistry. Diagnosis becomes important in research as the prevalence of the disease gets quantified based on diagnosis. Clinicians formulate a treatment plan and prognosticate their cases based on diagnosis. Patients choose the best-suited treatment for themselves based on the treatment options and prognosis provided to them. Decision to refer cases of AgP to specialists for further management can be made if cases are diagnosed accurately in the first instance. The treatment plan for AgP includes oral hygiene instructions and motivation and mechanical therapy, which may be supplemented by systemic antimicrobial therapy,[12,13] psychological therapy,[14] assessment of periodontal status of family members,[12] and plan for long-term maintenance at shorter recall intervals.[15] Incorrect diagnosis may result in the formulation of a treatment plan without addressing these vital issues. In academic dental institutions, cases are

Table 1: Comparison of responses between periodontists, specialists in oral medicine, and general dental practitioners using *Z*-test for proportion

Comparison between groups	Case document (first round)		Reordered case document (second round)	
	Staging	Diagnosis	Staging	Diagnosis
Periodontist versus specialist in oral medicine	0.213 (0.832)	1.13 (0.258)	0.239 (0.811)	0.981 (0.327)
Periodontists versus GDPs	0.482 (0.629)	1.529 (0.126)	1.910 (0.056)	1.127 (0.260)
Specialist in oral medicine versus GDPs	0.257 (0.797)	2.629 (0.009)*	1.613 (0.107)	2.06 (0.039)*

Values are expressed as Z value (P value). *Significance at 5% level. GDPs: General dental practitioners

Table 2: Mean Kappa scores of inter examiner variability for "case document" and "reordered case document" and Intra examiner variability and ANOVA between Periodontists, Specialist in Oral Medicine and GDPs

Respondent	Interexaminer for case document		Interexaminer for reordered case document		Intraexaminer	
	n	Mean kappa	*n*	Mean kappa	*n*	Mean kappa
Periodontists	20	0.8189	19	0.7643	19	0.7909
Specialist in oral medicine	18	0.8429	17	0.8063	17	0.7980
GDP	20	0.7235	18	0.7326	18	0.6923
ANOVA (P)	0.139		0.593		0.293	

GDP: General dental practitioner

allotted to students based on the diagnosis assigned by the screening clinicians. Therefore, diagnosis of cases has wide repercussions in clinical treatment, research, and dental education.

Difficulties in differential diagnosis between CP and AgP are present since the introduction of classification by the American Academy of Periodontology in 1999.[1] Differentiating cases of CP from AgP becomes more complex when family history is not very clear, and the patient is referred after initial periodontal therapy is already completed. One of the supporting features used to diagnose AgP is the mismatch between the amount of local factors and the amount of periodontal destruction. In cases, wherein initial therapy is already completed, this vital piece of information is missing for the assessment by the diagnosing clinicians. It would be possible that chances of incorrect diagnosis would be higher in such instances. This study aimed to evaluate the variations in diagnosis of CP from AgP.

Oshman *et al*. studied the influence of knowledge of patient's age on the diagnostic agreement of CP and AgP among periodontists.[16] Nine periodontal case reports were twice presented to periodontists, once with age withheld and again with patient age provided.[16] Diagnostic agreement increased to substantial agreement (0.61) when patient age was provided when compared to moderate agreement (0.49) when patient age was withheld.[16] In our case document, patient age was provided to the respondents. In our study, a high level of agreement (0.69–0.84) was noticed among specialists. Supplying information about patient age could have increased the chances of diagnostic agreement.

Lanning *et al*. examined the variation in the faculty responses to a series of web-based case exercises regarding the interpretation of clinical findings, periodontal diagnosis, and treatment planning.[17] Respondents included periodontists, general dentists, dental hygienists, and first-and second-year periodontal graduate students. Wide variations in diagnosis and numerous treatment plans were listed by the respondents for the cases evaluated.[17] However, the authors also discussed that some of the treatment plans suggested were essentially the same, but in technical terms were different.[17] Authors suggested using accepted practice guidelines and consensus-building discussions to decrease the variation among faculty and enhance dental education.[17] In our case document, information was supplied about the mismatch between the amount of local deposits and degree of periodontal destruction. This possibly would have resulted in high level of agreement regarding diagnosis seen among our respondents.

Apart from periodontists and specialists in oral medicine, our study also included GDPs. Darby *et al*. opined that detection and management of periodontal disease is an integral part of general dental practice.[18] Confidence to diagnose and manage periodontal disease was assessed among 550 dental practitioners in Victoria, Australia.[18] Among the respondents (52% response rate), confidence to diagnose and treat gingivitis was 95.4% and 96.4%, respectively. Confidence to diagnose and treat initial periodontitis was 88.3% and 87.9%, respectively. Around 91% and 62% reported confidence in diagnosing cases of advanced periodontitis and AgP, respectively.[18] The results of Darby *et al*.[18] study are in a broad sense similar to the results of our study. However, our study assessed the variations in diagnosis based on the responses to a series of cases, whereas Darby *et al*. study was self-reported confidence in diagnosis and treatment among GDPs. Consensus training programs/workshops have been advocated to achieve the high inter-rater agreement regarding periodontal diagnosis.[19]

Since a high degree of diagnostic agreement among clinicians is desirable, a revision of clinical criteria to distinguish between AgP and CP should be considered.[20] An American Academy of Periodontology recent task force report suggested consideration of patient age while diagnosing cases of CP and AgP. It also suggested revision of the criteria that distinguish between the two forms of the disease.[8] Mismatch between the amount of local factors and the amount of periodontal destruction wherever available should be considered as one of the major factors to differentiate between AgP and CP. High level of agreement seen in this case could possibly due to sharing of the above-mentioned information in the case document.

Another objective of the study was to assess the variations in the staging of AgP. Ten cases of AgP were grouped into three stages based on the severity as listed in the criteria provided in Figure 1. The level of variation for staging of AgP was very low (ranging from 2% to 5%). The objective criteria used based on the natural progression of the disease to stage the cases could be the reason for low variation in responses for staging. Among the ten cases of AgP, one case was Stage I, five were Stage II, and four were Stage III. Previous literature exists, wherein AgP was classified based on severity. Baer[21] suggested two stages (early and advanced), wherein early cases had gingiva with normal physiologic color and contour along with angular bone defects. Cases in advanced stage had migration and loosening of teeth with horizontal bone defects.[21] Baer correctly pointed out that early stages are accidentally detected during routine dental examination.[21] This highlights the importance of detailed probing during periodontal examination, wherein cases of AgP in early stage (according to Baer) or Stage I could be detected. Identification of cases in Stage I is crucial as prognosis for these cases is better and treatment is straightforward. Bial and Mellonig[22] categorized 182 AgP patients into Type I bone loss involving first molars and/or incisors and up to two additional teeth; Type II involving first molars/incisors and several additional teeth; and Type III with generalized

involvement (more than 14 teeth) but with bone loss notably more extensive on the first molars and/or incisors. However, the classification by Bial and Mellonig is based more on extent, than on severity.[22] Manson and Lehner[23] grouped AgP (then known as juvenile periodontitis) into two categories: (i) Juvenile periodontitis wherein cases were in the age group of 14–21 years, with lesser number of teeth involved, lower periodontal index, and high bone loss score and (ii) postjuvenile periodontitis wherein cases were in the age group of 22–29 years with higher number of teeth involved, higher periodontal index, and decreased bone loss score.[23] Hence, there is previous scientific evidence of using age to diagnose and stage AgP.

In this study, we have used a set of criteria for staging of AgP. For these set of criteria to be viewed favorably by a large group of learned people with diverse views, especially on a patient such as AgP, would definitely be an uphill task. In an attempt toward creating evidence in a systematic manner regarding the ease of use (for both clinicians and patients), reliability, reproducibility, validity, simplicity, and acceptability of the index, related questions were posed to respondents. This was an attempt by the authors to create the awareness of possibility of using such criteria to subclassify AgP into three stages based on severity. Most of the quantitative responses indicated that criteria were good to segregate the cases into three stages. Suggestions to include cause of tooth loss (periodontal disease, caries, or orthodontic reasons) and lack of an easy method to assess the percentage of bone loss are few of the qualitative responses received, which are worth mentioning. One of the listed criteria suggests using prognosis of remaining teeth to arrive at a decision regarding staging. Respondents pointed out that staging of cases will also have bias, since prognosis of any case has some inherent bias involved. The qualitative feedback provided by the respondents will be used to improve the criteria for staging of AgP, which may make staging of AgP easier for clinicians and researchers. Few of the respondents reported favorably highlighting the possible use of staging to assess the severity of AgP on the first visit as baseline data. Patients can also understand the stage of the disease and the need for more complex multidisciplinary treatment as the disease progresses to advanced stages (Stage II and Stage II).

Limitations of the study

The prepared "case document" provides abundance of ready-made information to the respondents to arrive at a diagnosis of either CP or AgP and further in the staging of AgP. It would be speculative to imagine that all clinicians would pick up the signs and symptoms of the cases mentioned in the "case document" if they were asked to evaluate actual patients in a clinical setting. Variations in diagnosis and staging would probably be higher in such instances. There are negative aspects of requesting responses from participants by sharing a case document electronically.[16] Respondents could have discussed with others before keying in their responses. Furthermore, respondents might have referred to their earlier responses for the "case document" before responding to the "reordered case document." However, collecting a number of cases of AgP (which is relatively rare) and then getting responses from a large number of clinicians would also be a daunting task. All the cases included in the "case document" were cases of generalized periodontitis and not localized.

Conclusions

Some variations exist among clinicians regarding the diagnosis of CP versus AgP despite providing all possible information about clinical features, images, and radiographs. Staging of AgP based on severity and listed criteria has lower variations. Usage of age and mismatch between the amount of local factors versus the amount of periodontal destruction as suggested in the AAP task force report on the update to the 1999 classification of periodontal diseases and conditions could be helpful to the clinicians in diagnosis of AgP.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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