A Survey Exploring the Experiences & Attitudes of Dental Implant Clinicians in the Management of Peri-implantitis within the United Kingdom

Keywords

Implants
Dental Implants
Peri-Implantitis
Periodontitis

Authors

Dr. Georgina Kane *
(MChD/BChD)

Dr. Vicky Fang *
(MChD/BChD)

Dr. Sowmya Simon *
(MChD/BChD)

Dr. Jenny Girdler *
(MChD/BChD)

Dr. Olivia Adeyinka *
(MChD/BChD)

Dr. Ahmed Alhilou *
(BChD, MFDS RCSEd, PG Cert(Res) , MSc ClinDent(Rest))

Address for Correspondence

Dr. Georgina Kane *

Email: georgiekane@gmail.com

* *Leeds Dental Institute, Worsley Building, Clarendon Way, Leeds*

Received: 14.09.2017
Accepted: 14.01.2018

doi: 10.1922/EJPRD_01761Kane07

ABSTRACT

Peri-implantitis remains one of the most challenging complications that could threaten the long-term survival of implants. The aim of this survey is to explore the experiences, attitudes and challenges that face clinicians in the management of peri-implantitis. A validated online questionnaire was emailed to implant clinicians in the United Kingdom. 72 clinicians responded to the questionnaire, all of whom face many challenges during the treatment of peri-implantitis, with 79% finding difficulties due to lack of treatment consensus and 78% finding treatment outcomes unpredictable. This survey highlights the marked differences in opinion and attitudes of clinicians in the management of peri-implantitis.

INTRODUCTION

The placement of implants has been a revolution to the field of dentistry, offering great advances in aesthetic and functional aspects for the replacement of missing teeth with excellent survival rates of 95.7% after 10 years.[1] Unfortunately, implants do not show complete success and their failure can be divided into either early or late. A major cause of late implant failure is peri-implant disease, which is a collective term to describe the diseases of peri-mucositis and peri-implantitis. Peri-mucositis is an infection-related inflammation around the peri-implant soft tissues only, and is considered to be a reversible disease with effective treatment regimens established.[2] Peri-implantitis is an irreversible process characterised by bone loss around the osseointegrated implant and pocket formation with the presence of bleeding and/or suppuration on probing.[3] This challenging pathological process is a result of an imbalance between the pathogenic oral biofilm at the dental implant surfaces and the host response.[4] The prevalence of peri-implantitis appears to be in the order of 10% of implants and 20% of patients during 5-10 years after placement, with smoking and previous history of periodontal disease being strong risk factors.[3]

As the number of implants being placed has greatly risen over recent years, the prevalence of peri-implantitis is suspected to increase in the future.[5] There is still a lack of evidence to suggest the most effective treatment modality to manage peri-implantitis.[6] There is not only uncertainty surrounding the criteria

for accurate diagnosis, but also for which non-surgical and surgical treatment modalities may be most effective. Although one treatment protocol currently exists, known as the CIST protocol, this protocol has not been assessed in its entirety, and there is conflicting evidence for the treatment options recommended.[7,8] The increasingly growing concerns of peri-implantitis was recently debated in the House of Lords on the 23rd of July 2014 by Baroness Gardner of Parkes, who stated that 'Peri-implantitis is an important and growing health problem and there needs to be an awareness and a degree of understanding of the present position and the growing risks associated'.[9] A recent study which compared the attitudes of dentists in the UK and Australia towards peri-implantitis discovered considerable variations between clinicians in the UK and Australia, highlighting the lack of strong consensus today in the management of peri-implant disease.[10] Due to limited evidence about effective management of peri-implantitis, the aim of this survey is to explore the current experiences, attitudes and challenges facing dental implant clinicians' in the management of peri-implantitis within the United Kingdom.

MATERIALS AND METHODS

An online based questionnaire was designed, internally validated and piloted to determine the experiences, attitudes and management schemes employed by implant clinicians based in the United Kingdom. It utilised both open and closed question types within the seventeen questions and was based on a previous questionnaire validated in Australia (Griffith University) and Sweden (University of Malmo)[10] which had nineteen questions.

Ethical approval from the Dental Research Ethics Committee was gained before the participants were contacted (IRB Number: FYP2015GDJC10). Participants were identified from the Association of Dental Implantology (ADI)[11] and British Society of Prosthodontics (BSSPD) databases, and classified as 'implant clinicians' if they were a registered dental surgeon within the United Kingdom who placed implants. Participants were electronically recruited via an email, which included a participant information sheet and a live link directly to the online questionnaire. 778 clinicians were identified from the ADI 'Find A Dentist' tool,[11] and an additional 500 emails were sent from the BSSPD. The questionnaire took no longer than 10 minutes to complete. The survey became available on the Bristol Online Survey website[12] between the 10th November 2015 until the 4th January 2016. The responses were automatically anonymised and stored securely. The survey can be viewed at: https://leeds.onlinesurveys.ac.uk/peri-implantitis.

No objective outcome measures were selected. The data was tabulated,[13] with the quantitative data analysed using descriptive statistics as a method of univariate analysis. Qualitative data was also recorded to gain further understanding of participants' viewpoints, and was analysed by coding the data into categories.

RESULTS

72 completed responses were recorded. The sample consisted of a much greater proportion of males (86.1%) compared to females (13.9%). The median age range was between 45–54 years, and the median period that subjects had been placing implants was between 6-10 years. The most common number of implants placed per year was between 0-50 implants (56.9%), however four respondents (5.6%) placed over 200 implants each year. Over 73% of respondents monitor 76-100% of the implants they place each year themselves, and the most popular recall period to review implants was between 6-12 months (52.8%). There was a wide range of different types of training attained by respondents *(Figure 1)*. An accredited specialist training programme was the most prevalent route of training with 34 respondents achieving this (47%), however in contrast, two respondents (2.8%) had received no postgraduate implant training. The incidence of peri-implantitis observed by the respondents *(Figure 2)* also had a wide range, as one respondent found peri-implantitis to be a weekly occurrence (1.4%) whereas 33.3% of participants witnessed the disease only annually. The prevalence of peri-implantitis appeared to have stayed the same for almost half (49%) of the respondents. 29% of respondents believed the prevalence had increased. They gave numerous reasons for this, and the most common reason was the increasing number of implants being placed.

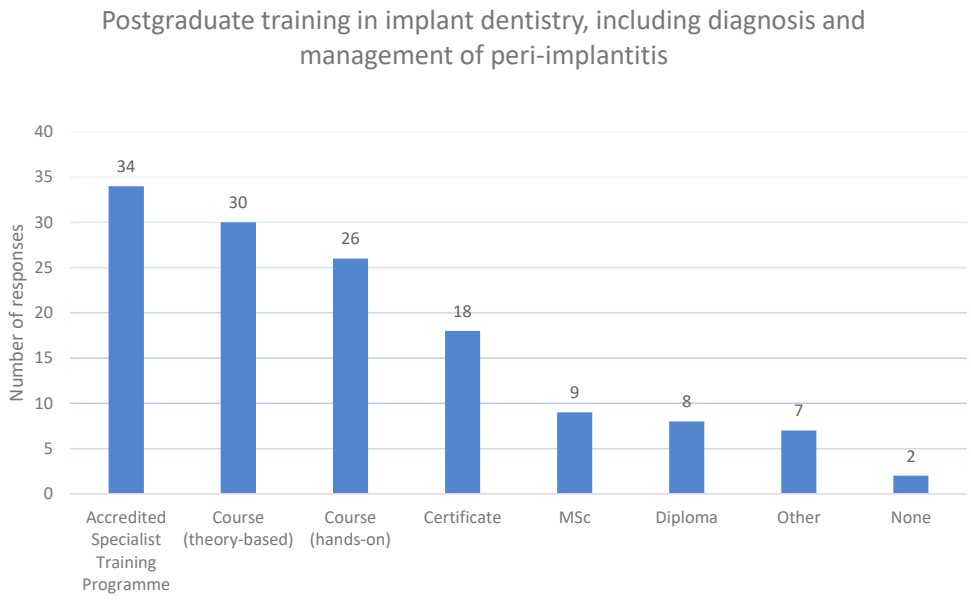

Figure 1: The distribution of different types of postgraduate training in implant dentistry.

All respondents faced many challenges during the treatment of peri-implantitis *(Figure 3)*. The most frequent difficulties faced were due to lack of treatment consensus and unpredictable treatment outcomes, recorded by 79% and 78% of participants respectively. There were also huge variations in attitudes towards which surgical and non-surgical treatments were believed to be effective. With regards to non-surgical treatment *(Figure 4)*, 59.7% of the sample found ultrasonic debridement effective, and 38.9% believed manual debridement to be an effective treatment. The frequency of antimicrobial use was similar for both local and systemic approaches, as 27.8% and 26.4% used them respectively. When asked to specify which hand instruments participants used, there was great diversity as to which instruments were effective *(Table 1)*. "Other" non-surgical methods mentioned in the free text included "oral hygiene instruction", as reported by three respondents. The most popular effective surgical treatment was open flap debridement, selected by 68% of the sample *(Figure 5)*. In comparison with non-surgical therapies, where 18% believed no treatments were effective, similarly 15% believed no surgical methods were effective. "Other" surgical treatments included the removal of the implant, which was mentioned by four respondents (5.6%). Over half (59.7%) of the clinicians did not feel confident in managing peri-implantitis. However, despite the lack of confidence, 65% of respondents reported that they managed the disease themselves *(Figure 6)*.

Table 1. The frequency of each type of non-surgical instrument believed to be effective.

Hand instruments used	Number of Responses (%)
Titanium scalers	11 (39%)
Standard periodontal scalers	9 (32%)
Plastic scalers	5 (18%)
Coated scalers	3 (11%)

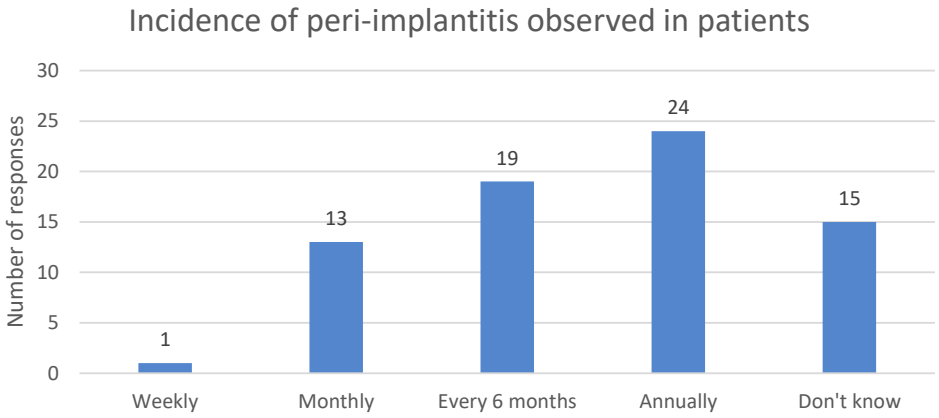

Figure 2: The incidence of peri-implantitis observed in patients by respondents.

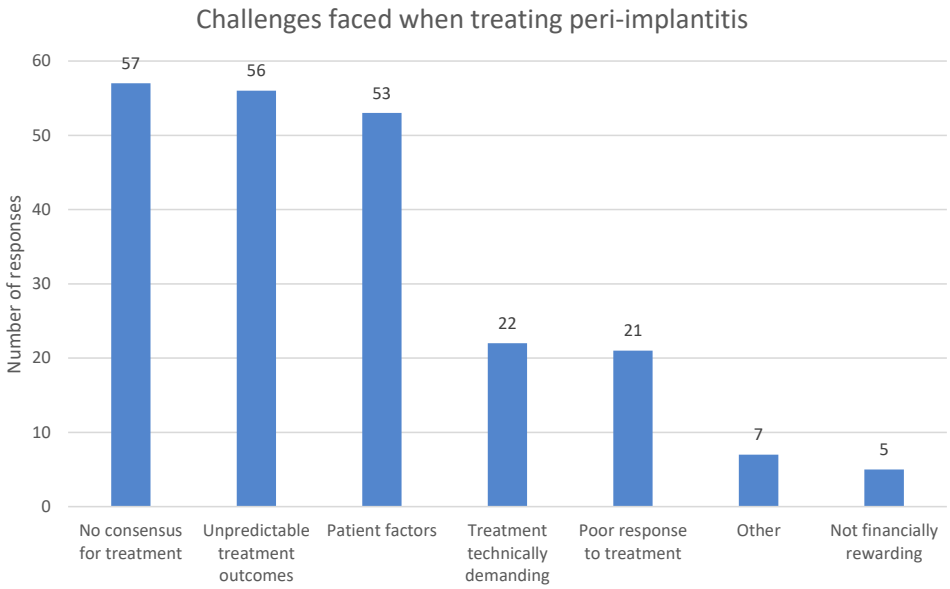

Figure 3: The variety of challenges faced by implant clinicians when treating peri-implantitis.

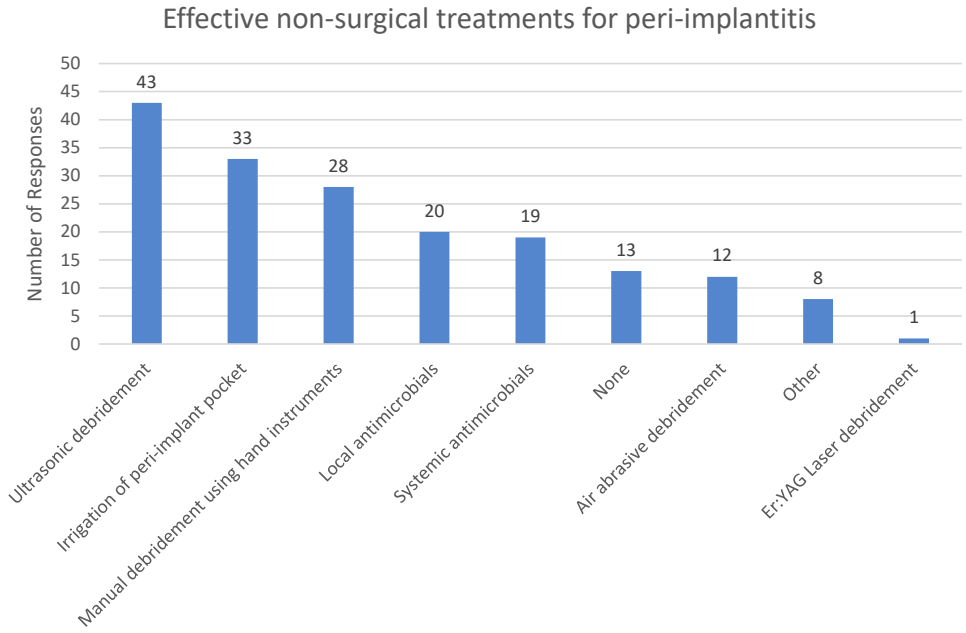

Figure 4: Different non-surgical treatments believed to be effective.

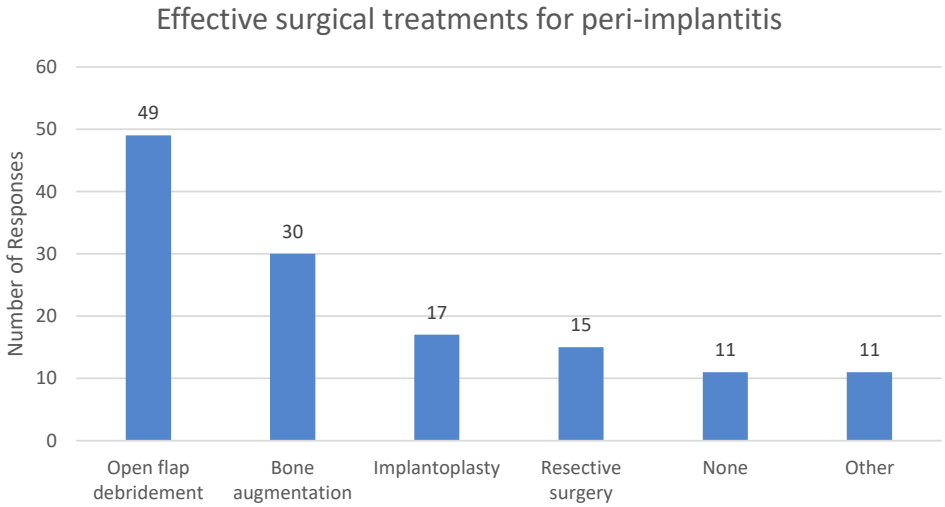

Figure 5: Different surgical treatments for peri-implantitis.

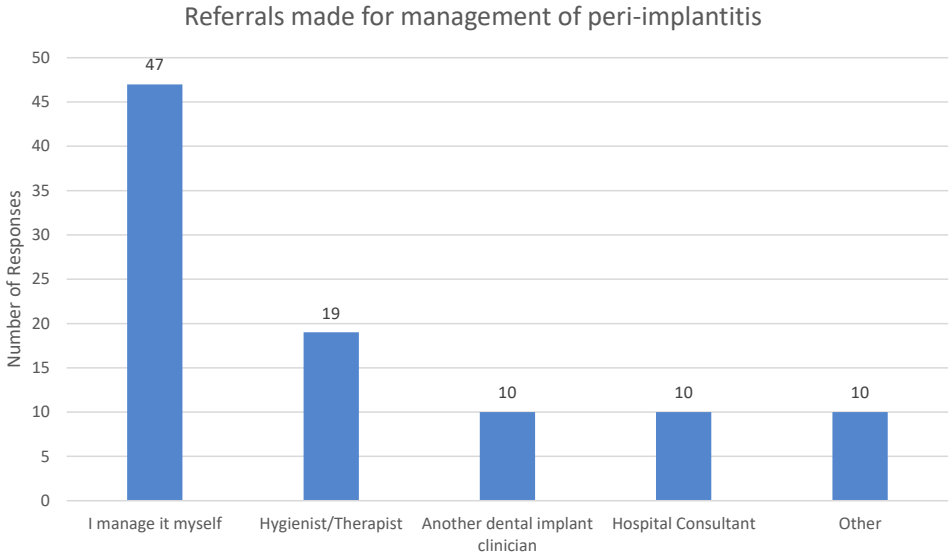

Figure 6: The distribution of referrals made to different specialties as part of peri-implantitis management.

In addition to the lack of confidence in peri-implantitis management, over half of the participants (54.2%) did not find any guidelines useful for the management of the disease. Amongst the respondents who did find some guidelines useful, the most commonly mentioned literature was from the ADI, as stated by 14 respondents, and the CIST protocol was mentioned by five respondents. When asked which resource each participant would like to see more of, the most popular answer by far (91.7%) was a request for updated literature (*Figure 7*). Free text comments discussed the need for "well-designed trials", and "evidence-based resources rather than anecdotal evidence".

DISCUSSION

The majority of respondents reported that lack of treatment consensus and unpredictable treatment outcomes were the main challenges in treating peri-implantitis. This emphasises the need for high quality research, especially as 92% requested updated literature as an additional resource. This supports the findings of a recent Cochrane review which stated that most studies on peri-implantitis consist of small sample sizes, with short follow-up periods and discrepancies between various interventions and outcome measures.[6] Although the CIST protocol is a currently recommended protocol,[1] only 7% of the sample were aware of it and found it effective. This may be because there are too many different interventions which can make it difficult to distinguish which are the clinically effective protocols.[6] There is also limited long term data to support the protocols and the patient perspective is not considered in terms of time and financial costs, which may contribute to the low number of clinicians using the CIST protocol.

Another significant result within the data was the fact that over half of current implant clinicians did not feel confident in managing peri-implantitis. This indicates an urgent need for developments to be made regarding this condition, which includes advances in education and postgraduate training as well as high quality research. This is an alarming result from the sample as it has a major impact on patient outcomes. From a patient's perspective, it would be distressing to discover that the majority of clinicians were not confident in treating a disease which is prevalent in up to 43% of implants.[14] In addition to this, many of the respondents manage the disease themselves rather than making a referral to specialist services. Reasons for this may be that the clinician placing the implant is ultimately responsible for the ongoing care and maintenance, as well as strict referral criteria in place for secondary care. The results did show that some clinicians managed the disease by referring to a hygienist, which highlights the essential need to include wider members of the dental team in the management of peri-implant disease.

There were huge variations between clinicians' opinions about which non-surgical treatments were effective. This appears to reinforce the view that there is a lack of treatment consensus, as it seems that clinicians are performing treatments based on their personal clinical experiences, rather than the best available evidence. In terms of specific treatments, the most popular treatment choice was ultrasonic debridement, although this has not been proven to be superior to other non-surgical methods and the outcome remains unpredictable.[4] Although studies have shown that using stainless steel periodontal scalers can damage the implant surface,[15] an alarming 32% of the sample were using these scalers for debridement. A recent systematic review into the efficacy of plastic scalers has proposed that these scalers are ineffective at removing plaque deposits,[16] despite 18% of the current sample finding them useful. However, it was reassuring that the most popular hand instrument was a Titanium scaler, which is considered to be the most effective instrument in disrupting the subgingival biofilm without causing significant damage to the implant surface.[17] The use of local and systemic antimicrobials, as used by one fifth of the sample, have conflicting results in the literature. Some studies have shown significant reductions in pocket depths with antimicrobials,[18] however Renvert *et al*[19]

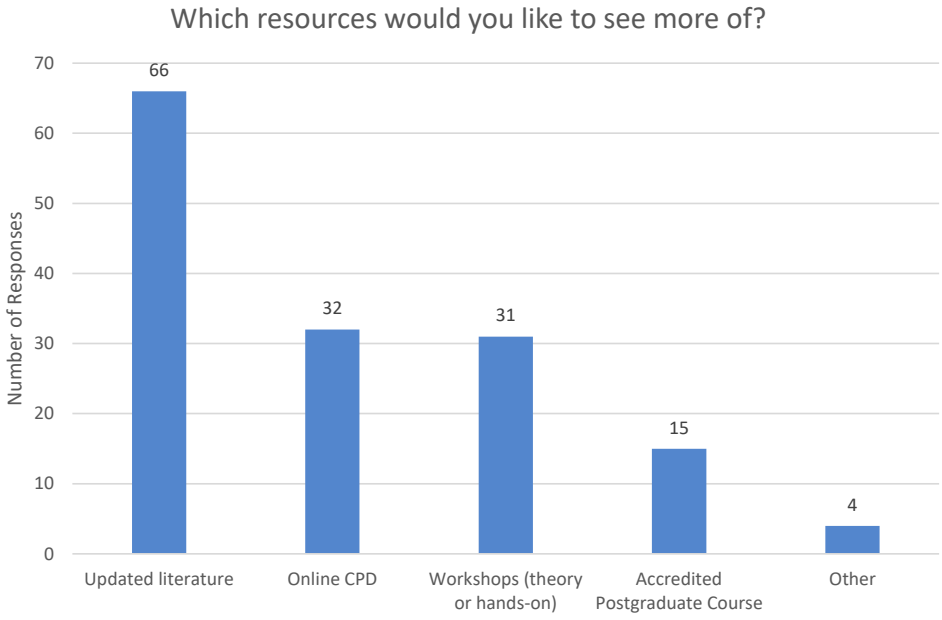

Figure 7: The different types of resources which respondents would like to see more of.

showed in a randomised clinical trial that their adjunctive use provided no additional benefit.[18] Both irrigation of the peri-implant pocket and use of air abrasion have only shown limited benefits to clinical parameters.[7] Er:YAG laser debridement was an unpopular treatment choice, chosen by only one respondent, and this reflects the literature which has not proven its effectiveness and requires further evaluation.[20,21] A recent case series has shown promising results with significant clinical improvements recorded following non-surgical therapy combined with diode laser,[22] however the results are limited by a small sample size.

Attitudes towards effective surgical treatments in this study also widely varied between clinicians. Open flap debridement was believed to be effective by the majority of the sample, which is in line with the literature, as this has shown to eliminate peri-implantitis symptoms as well as arrest bone loss progression due to improved access to the implant surface.[5] Bone augmentation was also a commonly selected treatment modality, which has shown some positive results but success appears dependent on a variety of local factors, including the amount of bone loss at the infected site.[23] There is also inconsistency between studies in terms of clinical parameters used as outcome measures.[23] Implantoplasty, a technique used to smoothen the exposed implant threads, was chosen by 24% of the sample. Although research has shown that a smoother surface can reduce the risk of peri-implantitis through decreased plaque accumulation, results remain unpredictable.[23] As shown by the 2012 Cochrane review, there is limited and variable success between all surgical protocols.[6] Ultimately, most studies investigating different surgical modalities rely on small sample sizes with limited external validity. Four respondents reported removal of the implant was an effective surgical approach. Although it may be argued that this eliminates the source of infection, the decision to remove an implant should not be taken lightly since the procedure is considered to be challenging as it may cause significant destruction to the surrounding bone structure. Depending on the method used to remove the implant, bone destruction might compromise future implant rehabilitation unless significant bone augmentation is involved.[24]

These results show similarities to the previous study carried out in the UK and Australia,[10] which had 105 respondents from the United Kingdom. The study concluded that there are some clear differences in both the opinions and attitudes of specialists, as well as their approaches to the management of peri-implant pathology. It is the author's opinion that due to the lack of treatment consensus and high-quality evidence, appropriate case selection needs to be prioritised, as well as a strong emphasis placed on prevention and patient education. An individually tailored supportive programme based on patient motivation and reinforcement of oral hygiene measures combined with regular supra gingival prophylaxis will help to significantly reduce the incidence of peri-implantitis.[25] Patients need to be educated about the risk factors associated with this disease, and regular maintenance and care are essential for early diagnosis and treatment.

CONCLUSIONS AND CLINICAL IMPLICATIONS

The results of this survey highlight the marked differences in opinion and attitudes of clinicians in the management of peri-implantitis. Within the limitations of this study, the general view is that absence of consensus treatment standards can significantly affect both surgical and non-surgical treatment modalities in which patients may receive. This study highlights the urgent need for high quality evidence to aid clinicians towards effective treatment guidelines in the management of peri-implantitis.

ACKNOWLEDGEMENTS

The authors would like to thank Professor Gail Douglas, Mr Shashwat Bhakta, Mr Peter Nixon, Dr Hannah Beddis and Mr Martin Chan at the Leeds Dental Institute, and Kirsten Berridge and the BSSPD for their support of the research.

REFERENCES

1. Pilloni, A. Peri-implant tissues inflammation: do we have the means to prevent it? *Dent Health*. 2014;**53**:28-30.
2. Vere, J., Bhakta., S., Patel, R. Prosthodontic complications associated with implant retained crowns and bridgework: a review of the literature. *Br. Dent. J*. 2012;**212**:267-272.
3. Mombelli, A., Muller, N., Cionca, N. The epidemiology of peri-implantitis. *Clin. Oral Implants Res*. 2012;**23**:67-76.
4. Lindhe, J., Meyle, J. Peri-implant diseases: Consensus Report of the Sixth European Workshop on Periodontology. *J. Clin. Periodont*. 2008; **35**:282-285.
5. Armas, J., Culshaw, S., Savarrio, L. Treatment of Peri-implant Diseases: A Review of the Literature and Protocol Proposal. *Dent. Up*. 2013; **40**:472-480.
6. Esposito, M., Grusovin, M., Worthington, H. Treatment of peri-implantitis: what interventions are effective? A Cochrane systematic review. *Eur. J. Oral Impl*. 2012;**5**:S21-S41.
7. Renvert, S., Roos-Jansaker, A., Claffey, N. Non-surgical treatment of peri-implant mucositis and peri-implantitis: a literature review. *J. Clin. Periodont*. 2008;**35**:305-315.
8. Lang, N.P., Berglundh, T., Heitz-Mayfield, L.J., Pjetursson, B.E., Salvi, G.E., Sanz, M. Consensus statements and recommended clinical procedures regarding implant survival and complications. *Int. J. Oral and Maxillofacial Implants*. 2004;**19**:150-154
9. King, E., Patel, R., Patel, A., Addy, L. Should implants be considered for patients with periodontal disease? *Br Dent J*. 2016;**221**:705-711
10. Mattheos, N., Collier, S., Walmsley, A. Summary of: Specialists' management decisions and attitudes towards mucositis and peri-implantitis. *Br Dent J*. 2012;**212**:1-7.
11. Association of Dental Implantology. Find a dentist. Available from: http://consideringdentalimplants.co.uk/find-a-dentist/index.html [Accessed 1st September 2017].
12. Bristol Online Survery. Online Survey Tool. University of Bristol. Available from: https://www.onlinesurveys.ac.uk/ [Accessed 1st September 2017].

13. Microsoft Excel. Redmond, Washington, USA. 2013.
14. Heasman, P., Esmail, Z., and Barclay, C. Peri-Implant Diseases. *Dent. Up.* 2010;**37**:511-516.
15. Tarawali, K. Maintenance and Monitoring of Dental Implants in General Dental Practice. *Dent. Up.* 2015;**42**:513-518.
16. Louropoulou, A., Slot, D. The effects of mechanical instruments on contaminated titanium dental implant surfaces: a systematic review. *Clin. Oral Implants Res.* 2014;**25**:1149-1160.
17. Renvert, S., Samuelsson, E., Lindahl, C., Persson, G. Mechanical non-surgical treatment of peri-implantitis: a double-blind randomized longitudinal clinical study. I: clinical results. *J. Clin. Periodont.* 2009; **36**:604-609.
18. Smeets, R., Henningsen, A., Jung, O., Heiland, M., Hammächer, C., Stein, J. Definition, etiology, prevention and treatment of peri-implantitis-a review. *Head Face Med.* 2014;**10**:34.
19. Renvert, S., Lessem, J., Dahlén, G., Lindahl, C., Svensson, M. Topical minocycline microspheres versus topical chlorhexidine gel as an adjunct to mechanical debridement of incipient peri-implant infections: a randomized clinical trial. . *J. Clin. Periodont.* 2006;**33**:362-369.
20. Al-Falaki, R., Cronshaw, M., Hughes, F. Treatment outcome following use of the erbium, chromium:yttrium, scandium, gallium, garnet laser in the non-surgical management of peri-implantitis: a case series. *Br Dent J.* 2014;**217**:453-457
21. Schwarz, F., Bieling, K., Nuesry, E., Sculean, A., Becker, J. Clinical and Histological Healing Pattern of Peri-Implantitis Lesions Following Non-Surgical Treatment With an Er:YAG Laser. *Lasers Surg Med.* 2006;**38**:663-671.
22. Mettraux, G., Sculean, A., Burgin, W., Salvi, G. Two-year clinical outcomes following non-surgical mechanical therapy of peri-implantitis with adjunctive diode laser application. *Clin Oral Impl Res.* 2016 **27**:845-849.
23. Serino, G., Turri, A. A Outcome of surgical treatment of peri-implantitis: results from a 2-year prospective clinical study in humans. *Clin. Oral Implants Res.* 2011;**22**:1214-1220.
24. Alani, A. and Bishop, K. Peri-implantitis. Part 3: Current modes of management. *Br Dent J.* 2014;**217**:345-349.
25. Ramanauskaite, A and Tervonen, T. The efficacy of supportive peri-implant therapies in preventing peri-implantitis and implant loss: a systematic review of the literature. *J Oral Maxillofac Res.* 2016;**7**:1-9.