ISSN: 0975-833X

Available online at http://www.journalcra.com

International Journal of Current Research
Vol. 8, Issue, 09, pp.38815-38819, September, 2016

INTERNATIONAL JOURNAL OF CURRENT RESEARCH

RESEARCH ARTICLE

IATROGENIC SOFT TISSUE INJURIES IN PATIENTS UNDERGOING VARIOUS DENTAL PROCEDURES -A SURVEY AMONG THE DENTAL PRACTIONNERS

[1,*]Sanjay Madhavan and [2]Dr. Sherlin Herald

[1]IIIyear BDS, Saveetha Dental College, Chennai, India
[2]Departmentof Oral Pathology, Saveetha Dental College, Chennai, India

ARTICLE INFO

Article History:
Received 22nd June, 2016
Received in revised form
24th July, 2016
Accepted 07th August, 2016
Published online 30th September, 2016

Key words:

Iatrogenic,
Practitioner,
Mucosa,
Gingival,
Soft Tissue.

ABSTRACT

Background: Iatrogenic injury can be defined as any trauma that has been induced by the dentist's activity, manner, or therapy. Any dental treatment during any phase can become iatrogenic. Dental iatrogenic treatment can produce injury to either on hard tissues or soft tissues of the oral cavity. Several examples of dental iatrogenic errors include traumatically induced dental materials and instruments, root perforations, bur perforations and soft tissue lacerations, apical extent of root canal fillings, overhanging restorations, injury to pulp, spherulocytosis, papillary hyperplasia, nerve injuries etc. Clinicians should make every effort to minimise iatrogenic injuries to the soft tissues.

Objective: The aim of the present study is to investigate the type of dental procedures likely to cause soft tissue iatrogenic injuries in patients undergoing varoius dental procedures, and to identify the most common anatomical site of injury.

Materials and Methods: A survey was conducted among 100 dental practitioners of Saveetha Dental College, Chennai. A self administered questionnaire was distributed and descriptive data in terms of percentage was analysed.

Result: The age group of the respondents ranged from 20-27 years. Most of the respondents had an accurate understanding of the term 'iatrogenic'. A majority of them identified mechanical damage to be common and considered mucosa and gingiva to be the likely site damaged during tooth preparation. Most of them chose that iatrogenic errors were common during crown preparation. Iatrogenic errors have been caused by a majority of the practitioners mainly while using burs and the commonly affected site being the mucosa and gingiva. The commonest preventive strategy employed by most dentists was careful handling of materials and instruments.

Conclusion: There is a need to know and increase awareness among dental practitioners about the role of iatrogenic factors for the successful outcome of any dental therapy, which unfortunately is ignored for a long time. Hence this study has been designed to identify the common iatrogenic errors and injuries that can occur during various dental treatment procedures and the common site of injury by the dental practitioners

Citation: Sanjay Madhavan and Dr. Sherlin Herald, 2016. "Iatrogenic soft tissue injuries in patients undergoing various dental procedures -a survey among the dental practionners" *International Journal of Current Research*, 8, (09), 38815-38819.

INTRODUCTION

'Iatrogenic' comes from the Greek language 'Iatros' means 'doctor or healer'. 'Gennan' means 'as a result'. Iatrogenic injury is a broad term that may be defined as 'harm, damage or impairment that results from the activities of a doctor'. Iatrogenic injury produced by either an inadvertent or erroneous treatment, or may be a result of either acts of commission or act of omission by the therapist (Vandersall, 1975).

Corresponding author: Sanjay Madhavan,
IIIyear BDS, Saveetha Dental College, Chennai, India

1)Dental iatrogenic treatment can produce an injury either on the tooth or the soft tissues or both. Any dental treatment during any phase can become iatrogenic. When carrying out treatment in the area of the mouth and face – especially when working on supine patients – there is an ever-present risk of collateral injury to the other oral and facial tissues. Not only is the oral environment a confined space, with restricted access, but the very nature of the dental tissues and the materials used to restore them requires powerful instrumentation that needs to operate in the immediate proximity of vulnerable soft tissues. There is a possibility that members of the dental team might become so accustomed to the above facts in their working lives that daily routines could start to mask the reality and lead to

complacency. It is important, therefore, to remind ourselves of how easily things can go wrong, of what can go wrong, and of what each member of the dental team can do to prevent accidental injuries. Continual vigilance by the whole dental team, care in daily clinical routines and the avoidance of complacency, can prevent most accidental injuries (http://www.theyoungdentist.com /uk/features/risk-management/ 532-accidental-injury.). Hence there is a need to increase awareness among dental practitioners about the role of iatrogenic factors in order to get successful outcome of any dental therapy.

MATERIALS AND METHODS

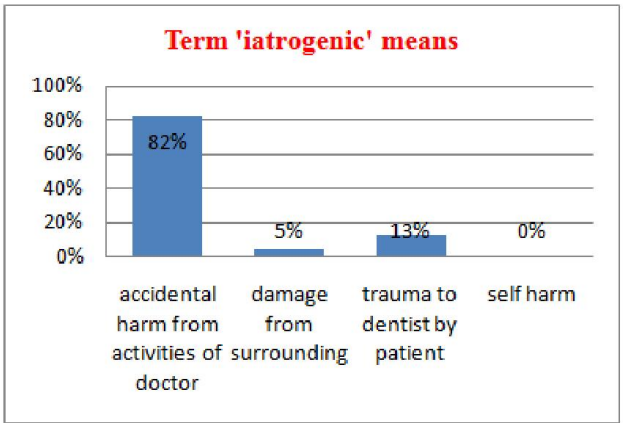
In this study a random of 150 dental practitioners of Saveetha Dental College was chosen, which included the undergraduates and post graduates who have been treating patients in their routine practice. A 15-item questionnaire was created for this study to assess the awareness about the iatrogenic soft tissue injuries that can occur to patients undergoing various dental treatment procedures.

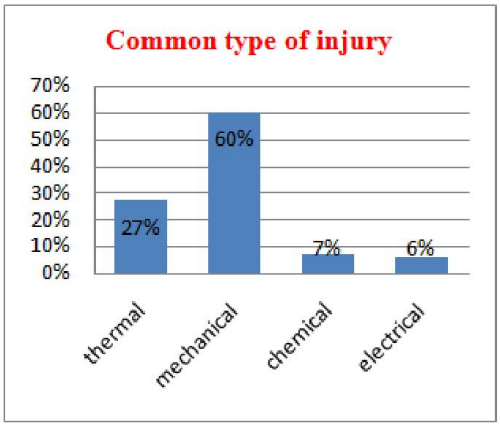
Questionnaires were distributed to the dental practitioners and filled questionnaires were collected. Data was entered in Microsoft Excel spreadsheet and descriptive data in terms of percentage was analysed.

RESULTS

150 dental practitioners completed the questionnaire. The respondents age ranged from 20 to 27. 82% of the dental practitioner's gave the correct response for the explanation of term 'iatrogenic'. The most common type of iatrogenic damage while dental procedure is mechanical (60%), followed by thermal, chemical and electrical. Around 96% of the dental practitioners were aware about the iatrogenic soft tissue injuries that can occur in patients during a dental procedure. According to 70%, the site that is likely to get damaged during tooth preparation is mucosa and gingiva, followed by tongue (22%), palate (6%) and lips (2%). The most likely site affected during any dental surgical procedures such as dentoalveolar, orthognathic surgeries etc., was chosen to be mucosa and gingiva.

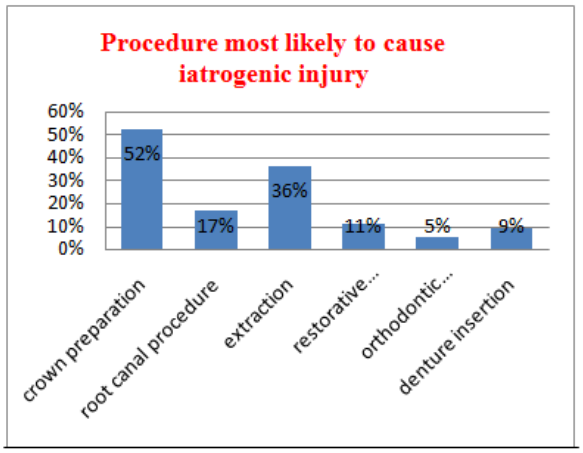
QUESTION	1	2	3	4
Term 'iatrogenic' means	(82%)Accidental harm that results from activities of doctor	(5%)Damage from surrounding	(13%)Trauma caused to the dentist by the patient	(0%)Deliberate self harm
Iatrogenic damage most common	(27%)thermal	(60%)mechanical	(7%)chemical	(6%)electrical
Site likely to get damaged during tooth preparation	(70%)Mucosa & gingiva	(22%)tongue	(6%)palate	(2%)lips
Procedure likely to cause iatrogenic damage	(52%)Crown preparation	(36%)extraction	(17%)Root canal procedure	(11%)Restorative procedure
Has any iatrogenic injury been caused	(91%)Yes	(9%)No		
Iatrogenic damage is common while	(57%)Using burs	(14%)During L.A (14%)Extraction	(4%)Orthodontic procedure	(2%)Chemical materials
Site	(48%)Mucosa/gingiva	(30%)Lips/cheeks	(13%)tongue	(0%)palate
Reporting to patient about the damage caused	(75%)Yes	(25%)No		
Preventive measures	(30%)Proper isolation techniques	(48%)Careful handling of materials and instrumentation	(24%)Information about procedure and give proper instructions to follow during procedure	(9%)Skill, experience and up-to-date knowledge

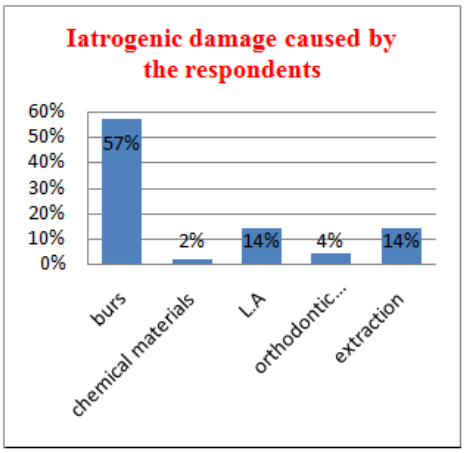


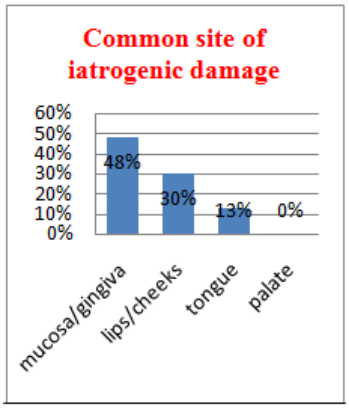


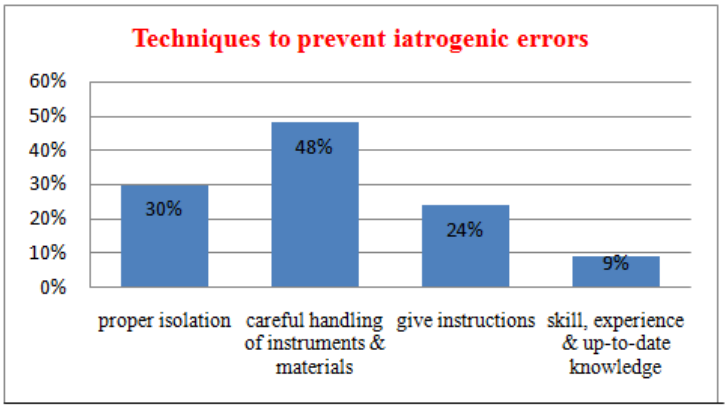
The questionnaire included queries covering the demographic details (name, age, gender) and questions regarding the common type of iatrogenic injury, the commonly affected site, procedures that tend to cause iatrogenic damage, awareness about possible types of injuries in daily practice and precautionary measures followed to prevent such injuries.

A majority of the dental clinician's cause an iatrogenic soft tissue injury to patients during crown preparation (52%), followed by extraction (36%), root canal procedure (17%), restorative procedures (11%), denture insertion (9%) and during orthodontic treatment (5%). The awareness among dentists about the fact that various medications and chemicals









can cause chemical burns to the soft tissues is 91%. 80% of the respondents are aware that during orthodontic procedure, iatrogenic trauma may occur due to improper handling and placement of archwires. 86% of the dentists are aware that instruments like burs, discs, scalers are likely to cause injuries to oral soft tissues. A majority of the clinician's (85%) are aware that crush injuries can occur during extraction procedures. 85% of the respondents are aware regarding the accidental pricking/tearing of the soft tissues while administration of local anesthesia. 88% of the dental practitioners are aware that improper placement of matrix band/wedge may result in injuries to the gingiva. 91% of the practitioners in their course of dental practice has caused iatrogenic damage most commonly to the mucosa and gingiva(48%) followed by lips/cheeks and tongue, most commonly while using burs(57%). 75% of the dentists report to the patient if any iatrogenic damage has been caused by them during their treatment procedure. The various precautionary measures taken by the dental practitioners to prevent such iatrogenic soft tissue injuries to the patient are careful handling of instruments and materials(48%), proper isolation(30%), informing patient about the procedure and provide proper instructions to follow during the procedure(24%) and the skill, experience and up-to-date knowledge(9%).

DISCUSSION

The soft tissues in the mouth which include the tongue, cheeks, gums and lips are delicate and sensitive and easily prone to damage.

Injury to the oral soft tissues during dental procedures may lead to severe pain, non coperation and also affect the quality of the treatment. Special considerations should be taken in avoiding this as they help in determining the success rate of any treatment procedure. Hence this study has been designed to help in planning out necessary precautions that can be taken to avoid any such mishap in the future. The term 'iatrogenic' refers to the accidental harm/damage which results from the activities of the doctor to their patient. It is of utmost importance to know about iatrogenesis in order to prevent any accidental pain or harm to the patient and deliver the treatment as smoothly as possible. Out of the 100 respondents 82 were aware about iatrogenesis.

In the field of dentistry, dentist needs to deal in a small area with lot of obstructions around the tooth structure. So, iatrogenic damage to the oral and para-oral tissue is likely to occur in every aspect of dentistry (Iatrogenic Damage to Dental Hard Tissues, 2015). Most of the practitioners felt that mechanical (60%) type of injuries are most commonly occurring followed by thermal (27%), chemical (7%) and electrical (6%). The four most significant factors leading to the soft tissue injuries are: (a) Visibility and access: Improper access and visibility may lead to accidental injuries. (b) The presence of local anaesthesia: When the patient's mouth has been numbed by the administration of local anaesthesia, they are oblivious to many of these injuries. This can exacerbate the problem because the dentist is not alerted to the damage that is being caused until it is too late. (c) The use of gloves: A gloved operator may be unaware that instruments maybe hot enough

to cause a burn injury to the unprotected patient's tissues. (d) Nervous patients: Any procedures which carry the risk of accidental injuries should be undertaken in the anticipation and readiness so that patients may not move suddenly and without warning (http://www.theyoungdentist.com/uk/features/risk-management/532-accidental-injury.). A majority of the dentists(96%) were aware about the various soft tissue injuries that could occur in patients during a dental procedure. According to 70% of the respondents, mucosa and gingival are most likely to get damaged during tooth preparation, then followed by tongue, palate and lips. 64% feel that mucosa and gingival are also damaged during dental surgical procedures. The mucosa and gingiva are in close proximation to the tooth. Hence during tooth preparation and surgical procedures, they are most likely to be traumatized either due to sudden movement of the patient when unaware of the procedure or due to the accidental slippage of the instruments being used by the dentists. 52% of the practitioners say that iatrogenic soft tissue injuries are most likely to occur during tooth preparation followed by during extraction (36%), root canal procedure (17%), restorative treatment (11%), denture insertion (9%) and during orthodontic treatment (5%). One of the inevitable iatrogenic damage occurs during tooth preparation. Tooth preparation(cavity /crown preparation during FPD etc.,) is usually done by high speed rotary instruments (http://pocketdentistry.com/12-physical-and-chemical-injuries-of-the-oral-cavity/#s0010). In this situation, many dentists accidentally hit the bur to the adjacent areas.

Chemical injuries of the oral soft-tissues may readily occur due to the large number of chemical substances, such as drugs and various agents, which come in contact with the oral cavity (Dilsiz, 2010). Dental adhesives have been shown to be toxic to the gingival fibroblasts (Huang *et al*., 2002; Szep *et al*., 2002). Residual monomers may cause gingival irritation and inflammation(9). Phosphoric acid, used as an etching material and as a root surface modifier, has necrotizing effects on periodontal soft tissues (Blomlof and Lindskog, 1995). 91% are aware that careless handling of various medications can cause chemical burn to the soft tissues. Mucosal trauma is fairly common during the orthodontic treatment and can be caused by many factors including ulceration by the brackets and the protruding archwires near the molar region, chemical burns from the acid-etchant and clumsy instrumentation (Zachrisson, 1976). Removable and fixed appliances carry with them the risk of tissue impingement by the wire components (retentive clasps, springs, canine retractors etc.). Lacerations and trauma to the gingiva and oral mucosa may often occur during the course of orthodontic treatment due to rubbing of the lips and cheeks on the archwire, brackets, bands and hooks, especially where long unsupported stretches of wire rest against the lips (Kerosuo, 2007). Occasionally, palatal or lingual arches may cause trauma to the palate or tongue. 80% of the respondents are aware that these iatrogenic errors can occur during orthodontic procedure. A majority of the practitioners (86%) know that the instruments rotating at high speeds such as discs, burs, scalers are likely to cause injuries. Powerful instruments, rotating at high speeds, are inevitably a hazard when introduced into a confined area such as the mouth. Discs and burs can cause devastating injuries. Other laceration injuries can be caused to various intra-oral tissues when these sharp instruments accidently slip during minor oral surgery or other procedures. Crush injuries most commonly arise during minor oral surgery procedures, resulting from the accidental trapping of some lip or cheek tissue in extraction forceps. 85% are aware about this. While administering local anesthesia, the dental professional must know the location of certain adjacent soft tissue structures, such as major blood vessels and glandular tissue, so as to avoid inadvertently injecting them. If certain soft tissue structures are accidentally injected with local anesthetic agent, complications may occur (Chapter, 2015). 5% are cognizant about the fact that while administering L.A, injury may occur by accidental pricking/tearing of the soft tissue. Improper placement and removal of matrix band/wedge during restorative procedures can result in inflammation of ginigva. With a limited number of clamp sizes fitting an unlimited variety of tooth shapes, rubber dam clamps often gouge the gingival and abrade the cementum and root surface, especially when inadequately seated and supported (Alexander, 1971). Gingiva can be lacerated with resultant periodontal damage and bacteremia when seating clamps (Smigel, 1988).

Out of the 100 practitioners, accidental iatrogenic soft tissue injuries have been caused by 91 of them in their usual clinical practice. The damage was most commonly while using burs during treatment procedures. With air-turbine handpieces, the rotating instrument does not stop immediately when the foot control is released. The operator must either wait for the instrument to stop or be extremely careful when removing the handpiece from the mouth so as not to lacerate soft tissues. Large discs are dangerous instruments used in the mouth and hence should be used with light, intermittent application and with extreme caution (16). The most commonly affected site was mucosa and gingival (48%) followed by lips/cheeks (30%) and tongue (13%). 75% of the respondents report to the patients when any iatrogenic damage has been caused by them. The preventive measure followed by 48% of the practitioners is careful handling of materials and instruments to preventive accidental spillage/slippage during treatment. 30% say that proper isolation techniques such as use of properly placed rubber dam, cotton rolls/gauze piece, suction can provide easy visibility and access to the area of work and prevent injuries to adjacent structures. According to 24% of the clinicians proper information about the procedure and proper instructions to follow during the time of procedure can help to gain the co-operation of the patient and prevent any iatrogenic damage to other areas. The remaining 9% believe that the operator should be skilled, experienced and have up-to-date knowledge to prevent the occurrence of such injuries. Thus, this study shows the awareness of the dental practitioners about iatrogenic soft injuries that can occur to the patient during a procedure. It gives us an idea about the procedure most likely to cause such errors and the commonly affected site so that necessary precautions can be employed to minimize such errors in the future.

Conclusion

Although 'To err is human', careful practice is very important for the principle, 'Primum non concere'("First do no harm") (Oral iatrogenesis, 2012). The dental practitioner has a responsibility to know the possible damage to the tooth and the surrounding tissues when using various chemicals and

instruments in varying procedures and to prevent such damage by protective methods and tissue management. With vigilant selection, diagnosis, treatment planning, monitoring, timely intervention, and good patient cooperation, one can ensure that the majority of patients would benefit from the procedure without any unwanted side effects at the end of treatment.

REFERENCES

Accidental injury in Riak management. http://www. theyoungdentist.com/ uk/features/risk-management/532-accidental-injury.

Accidental injury in Riak management. http://www. theyoungdentist.com/uk/features/risk-management/532-accidental-injury.

Alexander, R.E. 1971. Rubber dam clamp ingestion, an operative risk. JADA82(6):1378.

Blomlof, J., Lindskog, S. 1995. Periodontal tissue-vitality after different etching modalities. *J Clin Periodontol,* 22(6):464–8.

Chapter 9: Anatomy of Local Anesthesia. Jan 5, 2015. Posted by Mrzezo in General Dentistry.

Huang, T.H., Tsai, C.Y., Chen, S.L., Kao, C.T. 2002. An evaluation of the cytotoxic effects of orthodontic bonding adhesives upon a primary human oral gingival fibroblast culture and a permanent human oral cancer cell-line. *J Biomed Mater Res.,* 63(6):814–21.

Iatrogenic Damage to Dental Hard Tissues. Fayez Hussain Niazi, Zeeshan Qamar, Tayyaba Fatima. International Dental Journal of Student's Research, July - September 2015;3(3):128-131.

Kerosuo, H.M., Dahl, J.E. 2007. Adverse patient reactions during orthodontic treatment with fixed appliances. *Am J Orthod,* 132:789–95.

Operative dentistry instruments. Prof. asaad javaid. College of Dentistry, Almajma University, Zilfi. Chapter 7 Sturdevant's Art and Science of Operative Dentistry.

Oral iatrogenesis. Mohit Sharma, Sonal Sharma. Journal of dental sciences and oral rehabilitation , july-september 2012.

Physical and Chemical Injuries of the Oral Cavity. B. Sivapathasundharam. http://pocketdentistry.com/12-physical-and-chemical-injuries-of-the-oral-cavity/#s0010

Schmalz, G. 1998. The biocompatibility of non-amalgam dental filling materials. *Eur J Oral Sci.,* 106(2 Pt 2):696–706.

Self-Inflicted Oral Soft-Tissue Burn Due to Local Behavior and Treatment. A Dilsiz. J Clin Exp Dent. 2010;2(1):e51-54.

Smigel, I. 1988. Bonding hints easily tackle some special problem areas. Dentistry Today 2/:54.

Szep, S., Kunlel, A., Ronge, K., Heidemann, D. 2002. Cytotoxicity of modern dentin adhesives – in vitro testing on gingival fibroblasts. *J Biomed Mater Res.,* 63(1):53–60.

Vandersall, D.C.1975. Problems and dangers of adult tooth movement in general dentistry: Schlossberg A ed : Philadelphia: Saunders : 195.

Zachrisson, B.U. 1976. Causes and prevention of injuries to teeth and supporting structures during orthodontic treatment. *Am J Orthod.,* 69:285–300.

****