SMART DENTAL UPDATES

Volume 5 | Issue 43 |2024

Dear Doctor,

Greetings from Micro Labs Limited. We are happy to bring you **"SMART DENTAL UPDATES"** which contain latest and interesting news in the field of Dentistry.

This issue contains:

- **Satisfaction of edentulous patients and their oral health impact profile with denture adhesives: A randomised clinical trial**
- **Comparison of Postoperative Pain between Single-Visit Endodontic Treatment with Gutta-Percha and Mineral Trioxide Aggregate Filling**
- **Assessment of the Precision of a Novel Modified Single Computed Tomography Scanning Approach in Facilitating Dental Implant Placement: A Retrospective Observational Study**
- **Maxillary Third Molar Displacement into the Infratemporal Fossa during Extraction: A Case Report**

Should you need any article or information feel free to contact us at medicalservices@microlabs.in

Looking forward to your valuable feedback

Best Regards,
Medical Team, Micro Labs Limited

Satisfaction of edentulous patients and their oral health impact profile with denture adhesives: A randomised clinical trial

INTRODUCTION

COMPLETE DENTURE

Patients who were totally edentulous reported better quality of life and increased patient satisfaction while using denture adhesives.

Although the occurrence of edentulism is decreasing, the proportion of individuals without teeth is expected to remain high due to the aging population. Edentulism negatively affects both the quality of life and nutrition of patients. Traditional complete dentures continue to be a popular choice for treating edentulous individuals, contributing to an enhancement in oral health-related quality of life. Complete dentures are widely embraced for their anticipated aesthetic benefits, support for normal speech, and assistance in maintaining proper chewing function.[1] Complete denture retention relies on various physical mechanisms, such as adaptation to supporting tissues, a thin saliva film between the denture and tissues, proper peripheral edge extension, and atmospheric pressure. Denture adhesives are among the options to boost retention and stability, consistently shown in numerous studies to enhance the quality of life and satisfaction of patients. However, some patients find these products messy and potentially causing gagging. The clinical benefits of using complete denture adhesives remain a debated topic, primarily due to limited available data on their effectiveness.[2] So, this study aimed to evaluate the satisfaction of edentulous patients and their oral health impact profile after being supplied with three different types of denture adhesives.

METHODS

A single-blind, randomized clinical trial involved 64 participants aged 48 to 83 seeking new complete dentures. Only those with normal alveolar ridge volume and resilience were included. The completely edentulous participants were randomly assigned to three groups, each receiving adjusted complete dentures. After a month of denture use, participants rated satisfaction using a 100mm visual analog scale for comfort, retention, stability, mastication efficiency, and speech. They also completed the Oral Health Impact Profile for Edentulous Patients (OHIPEDENT) questionnaire. Each group then used a specific denture adhesive: Group C - Corega Ultra denture adhesive cream, Group O - Olivafx, and Group S - Sea.Bond adhesive strips. Statistical tests, including Mann-Whitney U, Wilcoxon-signed rank, and Kruskal Wallis, were employed to analyze differences in visual analog scale (VAS) and oral health impact profile (OHIP) scores before and after adhesive use within and between groups.

RESULTS

It was observed that there were significant differences in all VAS scores after adhesive application in all groups, with Group O and Group S having the lowest VAS scores for ease of cleaning (P>0.05) as shown in Table 1. The ease of cleaning negatively impacted by all three adhesives, as demonstrated by negative differences in VAS scores before and after adhesive use, reaching significance only in Group C. The total OHIP values decreased significantly after adhesive use in all groups, with some OHIP items significantly lower in each group. The differences in VAS scores after adhesive use were not significantly different among the three adhesive types (P>0.05), except for ease of cleaning, which showed significance between Group C and Group S (p=0.005). In terms of OHIP scores, the differences between the three groups were statistically insignificant (P>0.05).

Table 1. Comparison of the VAS values before and after the use of adhesives using Mann Whitney U test

Item	Group C	Group O	Group S
General satisfaction	9.0±5.6*	9.0±4.9*	10.0±4.7*
Satisfaction with maxillary dentures	9.0±3.4*	8.0±2.4*	11.0±3.5*
Satisfaction with mandibular dentures	18.0±6.6*	12.0±5.7*	10±3.9*
Satisfaction with comfort maxillary	21.0±7.1*	22.0±6.9*	22.0±8.2*
Comfort mandibular	19.0±6.8*	15±4.3*	11.0±5.3*
Retention maxillary	9.0±3.3*	11.0±3.7*	10.0±4.2*
Retention mandibular	22.0±6.1*	21±7.2*	16±5.4*
Ease of cleaning	−20±6.4*	−9.0±3.4	−3.0±1.5
Chewing	16.0±5.0*	12±5.6*	13±4.1*
Speech	8.0±2.7*	9.0±3.1*	10.0±2.4*

DISCUSSION

In all three groups, the findings of the present study indicated a significant enhancement in patient satisfaction scores and OHIP scores with the use of denture adhesives.[2] Numerous studies explored adhesive usage experiences using questionnaires or VAS, and almost all of them documented positive outcomes.[3] Torres-Sánchez C et al. illustrated that the use of complete denture adhesives significantly enhanced patient satisfaction due to improved retention, stability, and reduced accumulation of food particles between the denture and the mucosa.[4]

CONCLUSION

Application of denture adhesives in completely edentulous patients led to increased satisfaction, evidenced by elevated VAS scores, and enhanced quality of life, reflected in lower OHIP-EDENT scores post-adhesive use. The nature of the adhesive did not significantly impact these improvements, except for ease of cleaning, where adhesive strips demonstrated easier maintenance compared to paste-type adhesives.

REFERENCE

1. Soboleva U, Rogovska I. Edentulous Patient Satisfaction with Conventional Complete Dentures. Medicina (Kaunas). 2022 Feb 24;58(3):344.
2. Ereifej NS, Oweis YG, Abu-Awwad M. The effect of using denture adhesives on patient satisfaction with complete dentures; a randomized clinical trial. BMC Oral Health. 2023 Dec 19;23(1):1027.
3. Shu X, Fan Y, Lo ECM, Leung KCM. A systematic review and meta-analysis to evaluate the efficacy of denture adhesives. J Dent. 2021 May;108:103638.
4. Torres-Sánchez C, Montoya-Salazar V, Torres-Lagares D, Gutierrez-Pérez JL, Jimenez-Castellanos E. Satisfaction in complete denture wearers with and without adhesives: A randomized, crossover, double-blind clinical trial. J Clin Exp Dent. 2018 Jun 1;10(6):e585-e590.

Comparison of Postoperative Pain between Single-Visit Endodontic Treatment with Gutta-Percha and Mineral Trioxide Aggregate Filling

INTRODUCTION

MTA as a root canal filler material might be a useful choice for physicians because of its low postoperative pain

Managing postoperative pain after root canal treatment continues to be a concern for dental clinicians, with reported frequencies of patients experiencing such pain ranging from 3% to 58%. Following chemo-mechanical debridement of the root canal, filling materials are employed to seal the disinfected canal.[1] Gutta-percha (GP) stands out as the predominant core obturation material in contemporary endodontics due to its numerous benefits, including easy manipulation, radiopacity, low toxicity, and plasticity. However, it lacks the ability to bond to dentin and undergoes contraction when cooled.[2] In response to these limitations, innovative materials like calcium silicate-based cement have been introduced. Bioceramics, characterized by biocompatibility and bioactivity, offer excellent dimensional stability, antibacterial properties, slight expansion, and effective sealing capabilities.[1] Mineral Trioxide Aggregate (MTA) stands out as the widely recognized bioceramic material possessing the essential properties mentioned above, and it has been extensively utilized in various endodontic procedures.[3] As far as our knowledge extends, no studies have assessed the impact of root canal filling materials on endodontic postoperative pain. In this randomized superiority trial, the author investigated and compared postoperative pain levels between the use of gutta-percha (GP) with sealer and mineral trioxide aggregate (MTA) as root canal filling materials in teeth exhibiting asymptomatic apical periodontitis.

METHODS

In this initial assessment of a two-arm, parallel-group, single-blind, superiority randomized trial, a total of 119 patients were considered. Inclusion criteria encompassed participants aged 18–65 with restorable single-canal maxillary or mandibular premolar teeth exhibiting asymptomatic apical periodontitis (no sensitivity to percussion or palpation) and confirmed necrotic pulp using ENDO-FROST spray cold and periapical radiography, without preoperative pain. Utilizing the permuted block randomization method, participants were ultimately divided into two groups. In the GP group (N=46), root canals were filled with gutta-percha and AH Plus sealer, while in the MTA group (N=48), root canals were filled with an MTA apical filling and coronal gutta-percha and sealer. Patient pain levels were assessed at 6, 12, 24, 48, and 72 hours postoperatively using a 10-point visual analog scale (VAS). The VAS categorization included: no pain (0), mild pain (1–3), moderate pain (4–6), and severe pain (7–10). Statistical analyses were conducted using chi-square, independent t test, Friedman, and Mann-Whitney U tests.

RESULTS

The maximum pain intensity was observed at the 6-hour mark, displaying a significant decrease over time in both groups (P<0.001, Friedman test). Mean VAS scores were consistently lower in the MTA filling group compared to the GP group with GP and sealer at all-time points (P<0.05, Mann-Whitney U test) (Table 1). Regarding gender, female patients reported higher VAS scores in both groups after 6 and 12 hours (P<0.05, Mann-Whitney U test), but not at other intervals. When stratifying by tooth location, no significant difference was found between maxillary and mandibular teeth in both groups (P>0.05, Mann-Whitney U test). Additionally, three participants experienced swelling, two in the MTA filling group and one in the GP and sealer group, all of which were pharmacologically managed. One case in the MTA group also exhibited discoloration.

Table 1. Mean (SD) of both groups' pain levels at various intervals

Time point	Gutta-percha	MTA	P-value
	Mean (SD)	Mean (SD)	
6 h	2.74 (2.93)	1.04 (2.43)	<0.001
12 h	2.30 (2.89)	0.84 (2.42)	<0.001
24 h	1.86 (2.76)	0.58 (2.04)	<0.001
48 h	1.68 (2.74)	0.40 (1.65)	0.002
72 h	1.44 (2.60)	0.38 (1.65)	0.005
P-value	<0.001	<0.001	

DISCUSSION

The current trial revealed that employing MTA, followed by a coronal seal with GP as root canal filling materials, led to significantly less pain compared to using GP and sealer.[1] Findings from a randomized controlled trial suggested that the success rate of MTA as a root canal filling material was comparable with that of GP.[4] Patients undergoing MTA treatment experienced the least pain across all time intervals. Post-pulpotomy pain showed a significant reduction at 18 and 24 hours and from days 2 to 7 post-treatment in the MTA group.[5]

CONCLUSION

Given the reduced postoperative pain associated with MTA as a root canal filling material, it could be a beneficial choice for clinicians. Nevertheless, the specific mechanism contributing to lower pain levels remains unclear, warranting additional research.

REFERENCE

1. Khabiri M, Kamgar S, Iranmanesh P, Khademi A, Torabinejad M. Postoperative pain of single-visit endodontic treatment with gutta-percha versus MTA filling: a randomized superiority trial. BMC Oral Health. 2023 Dec 19;23(1):1026.
2. Gasner NS, Brizuela M. Endodontic Materials Used To Fill Root Canals. 2023 Mar 19. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 Jan–. PMID: 36508541.
3. Jitaru S, Hodisan I, Timis L, Lucian A, Bud M. The use of bioceramics in endodontics - literature review. Clujul Med. 2016;89(4):470-473.
4. Alsulaimani RS. Single-visit endodontic treatment of mature teeth with chronic apical abscesses using mineral trioxide aggregate cement: a randomized clinical trial. BMC Oral Health. 2016 Aug 23;16(1):78.
5. Bagheri M, Khimani H, Pishbin L, Shahabinejad H. Effect of Pulpotomy Procedures With Mineral Trioxide Aggregate and Dexamethasone on Post-endodontic Pain in Patients with Irreversible Pulpitis: A Randomized Clinical Trial. Eur Endod J. 2019 Jun 20;4(2):69-74.

Assessment of the Precision of a Novel Modified Single Computed Tomography Scanning Approach in Facilitating Dental Implant Placement: A Retrospective Observational Study

INTRODUCTION

The accuracy of implant placement was higher with the MSCT approach than with the SCT and DCT procedures.

In oral implant treatment, the placement position of the implant significantly influences the safety of oral implant surgery and the morphology of the final prosthesis. Achieving three-dimensional (3D) bone morphology through a preoperative computed tomography (CT) scan and ensuring precise implant placement through preplanning with simulation software are crucial for successful oral implant surgery. Current static surgical guide fabrication methods can be broadly categorized into two types: the double computed tomography scan (DCT) method and the single CT scan (SCT) method. The DCT method involves two types of CT images, and artifacts may obscure 3D anatomical structures of soft and hard tissues, potentially affecting diagnostic accuracy. On the other hand, the SCT method, which uses a single CT image, was not suitable for complete edentulous patients and those with few remaining teeth due to challenges in accurate data matching.[1] Hence, a solution to address all the mentioned issues involved the development and introduction of a modified single CT (MSCT) scan method.[2] Nevertheless, the precision of guided surgery employing the MSCT method has not been assessed in comparison to other established surgical guide fabrication techniques. Hence, this study was undertaken to appraise the accuracy of computer-guided implant surgery utilizing a surgical guide produced through the MSCT method, contrasting it with the DCT and SCT methods.

METHODS

This retrospective observational study encompassed 183 cases (183 surgical guides, and 485 implants) involving static-guide-assisted implant placement surgery at a dental clinic, utilizing the SCT, DCT, or MSCT methods. The SCT method was exclusively applied to cases featuring one or more untreated natural teeth (far from artifacts) in the three segments: anterior teeth, right molars, and left molars. Surrogate endpoints for implant placement accuracy were measured by assessing three-dimensional (3D) deviations (in millimeters) at the entry and tip of the implant body between preoperative simulation and actual placement. Data extracted from medical records and CT scans included details such as sex, age at implant placement surgery, surgical guide fabrication method, number of remaining teeth, implant length, implant location, alveolar bone quality, and bone surface inclination at the implant placement site in preoperative simulation. Risk factors affecting implant placement accuracy were examined using generalized estimating equations.

RESULTS

The median 3D deviations for the SCT method were 0.788 mm at the entry and 1.084 mm at the tip. For the DCT method, the median 3D deviation at the entry was 0.646 mm, and at the tip, it was 1.100 mm. In the case of the MSCT method, the median 3D deviation at the entry was 0.522 mm, and at the tip, it was 0.674 mm. Results indicated that the median 3D deviations with the MSCT method were significantly smaller than those with the SCT and DCT methods at both the entry and tip of the implant body (Table 1, $p<0.01$). Risk factors for larger 3D deviation at the entry included the SCT and DCT methods (odds ratios [ORs] vs. MSCT method: 1.438, 1.178, respectively), posterior location (OR: 1.114), bone surface buccolingual inclination (OR: 0.997), and age at implant placement surgery (OR: 0.995). Similarly, risk factors for larger 3D deviation at the tip of the implant body included the SCT (OR: 1.361) and DCT methods (OR: 1.418), posterior location (OR: 1.190), implant length (OR: 1.051), and age at implant placement surgery (OR: 0.995).

Table 1. Comparing 3D deviation across all surgical guide manufacturing techniques

	The entry of implant body								The tip of implant body						
	n	Mean±SD	Quantiles					p value	Mean± SD	Quantiles					p value
			0%	25%	Median	75%	100%			0%	25%	Median	75%	100%	
SCT method	44	0.821±0.431	0.108	0.623	0.788	1.008	2.315	a–b 0.059	0.996±0.440	0.033	0.742	1.084	1.269	2.215	a-b 0.430
								a–c <0.001							a-c <0.001
DCT method	268	0.690±0.399	0.000	0.428	0.646	0.891	2.259	b–a 0.059	1.131±0.545	0.050	0.727	1.100	1.433	3.496	b-a 0.430
								b–c 0.002							b-c <0.001
MSCT method	168	0.564±0.304	0.077	0.338	0.522	0.738	1.978	c–a <0.001	0.742±0.394	0.091	0.451	0.674	0.991	2.091	c-a <0.001
								c–b 0.002							c-b <0.001

DISCUSSION

The objective of this retrospective observational study was to assess variations in the precision of implant placement positions between the recently introduced MSCT method and established surgical guide fabrication methods. Unlike many previous studies that primarily compared accuracy with and without a surgical guide, this study aimed to specifically investigate the differences associated with the newly developed MSCT method in comparison to existing methods.[3] No prior studies have conducted a comparison of placement accuracies among different surgical guide fabrication methods. This study marks the first attempt to include types of static surgical guide fabrication methods as explanatory variables and to identify potential risk factors impacting implant placement accuracy. The findings of this study revealed that the MSCT method significantly enhances implant placement accuracy at both the entry and tip of the implant body when compared to the DCT and SCT methods. In a meta-analysis assessing 3D deviations at the implant body placement position using the DCT and SCT methods, the mean 3D deviations were reported as 1.2 and 1.4 mm at the entry and tip, respectively.[4] In this investigation, the mean 3D deviations for the SCT method were 0.82 mm at the entry and 1.00 mm at the tip, while for the DCT method, they were 0.69 mm at the entry and 1.13 mm at the tip. Considering these values, implant placement surgeries using the SCT and DCT methods

in this study exhibited comparable or superior accuracies compared to those reported previously. Nonetheless, the MSCT method demonstrated significantly smaller 3D deviations than both the SCT and DCT methods at both the entry and tip of the implant body. These findings underscore the efficacy of the MSCT method.

CONCLUSION

The MSCT method demonstrated a notable enhancement in implant placement accuracy at both the entry and tip of the implant body, surpassing the performance of the DCT and SCT methods. Notably, severe complications were exclusively observed in cases utilizing the DCT method.

REFERENCE

1. Shimizu H, Mino T, Kurosaki Y, Arakawa H, Tokumoto K, Kimura-Ono A, Maekawa K, Kuboki T. Accuracy of a novel modified single computed tomography scanning method for assisting dental implant placement: a retrospective observational study. Int J Implant Dent. 2023 Nov 2;9(1):42.
2. Shimizu H, Arakawa H, Mino T, Kurosaki Y, Tokumoto K, Kuboki T. Newly developed data-matching methodology for oral implant surgery allowing the automatic deletion of metal artifacts in 3D-CT images using new reference markers: A case report. J Prosthodont Res. 2021 Feb 24;65(1):125-129.
3. Chen S, Ou Q, Lin X, Wang Y. Comparison Between a Computer-Aided Surgical Template and the Free-Hand Method: A Systematic Review and Meta-Analysis. Implant Dent. 2019 Dec;28(6):578-589.
4. Tahmaseb A, Wu V, Wismeijer D, Coucke W, Evans C. The accuracy of static computer-aided implant surgery: A systematic review and meta-analysis. Clin Oral Implants Res. 2018 Oct;29 Suppl 16:416-435.

Maxillary Third Molar Displacement into the Infratemporal Fossa during Extraction: A Case Report

INTRODUCTION

Dental practitioners routinely conduct the extraction of retained and completely impacted third molars, a common surgical procedure with generally low complication rates. However, inadvertent displacement of the maxillary third molar into nearby anatomical spaces poses a significant challenge during these surgeries. The prevalent sites for migration in such surgical interventions include the infratemporal fossa, pterygomandibular space, maxillary sinus, buccal space, and lateral pharyngeal space.[1] Yet, displacement of the maxillary third molar into the infratemporal fossa (ITF) remains an uncommon occurrence. Various approaches have been devised to address

For maxillary third molars that are severely impacted, special care should be taken during extraction.

Figure 1. Mesioangular impaction of the right maxillary third molar seen on the preoperative orthopantomogram.

teeth displaced into adjacent spaces.[2] In this case, the report outlined the management of a maxillary third molar that was displaced into the infratemporal fossa (ITF) during a surgical extraction performed under local anesthesia.

Figure 1. An orthodontia displaying the third molar on the right maxilla displaced into the infratemporal fossa.

CASE PRESENTATION

A 34-year-old woman was referred for the extraction of the right maxillary third molar who had been experiencing intermittent pain on the right side of her upper jaw for the past 4 weeks. Seeking advice at a private clinic, the dentist attributed the pain to the impacted third molar on the same side. Clinical examination revealed the absence of third molars and left maxillary and mandibular second molars. Panoramic radiography unveiled deeply impacted right maxillary and mandibular third molars (Figure 1). Despite being asymptomatic, the patient was advised against extraction. However, adamant about removal, the patient insisted on extracting the impacted maxillary third molar. During the luxation procedure, the tooth disappeared, resulting in severe bleeding from the extraction site and the nose. Attempts to make a releasing vertical incision and extract the tooth failed due to the patient's anxiety and uncooperativeness. Consequently, wound closure was carried out using a polyglactin 3-0 suture. The patient was presented with alternative surgical and conservative management options, such as leaving the tooth in the fossa without intervention or postponing the extraction for two months. Choosing immediate surgical removal, the patient was admitted for management under general anesthesia. A panoramic radiograph (Figure 2) and three-dimensional computed tomography (CT) revealed the third molar's location in the infratemporal fossa. The tooth was successfully retrieved via an oral approach using the previous incision. Postoperatively, the incision was sutured using Vicryl (3-0). A follow-up after 2 weeks demonstrated complete healing with no swelling or other complications.

DISCUSSION

Complications during the extraction of third molars may arise from various factors. According to Di Nardo et al., displacement of maxillary third molars into the infratemporal fossa (ITF), situated beneath the base of the skull between the pharynx and mandibular ramus, was typically linked to inappropriate extraction techniques, distopalatally angulated teeth, reduced visibility during the surgical procedure, or insufficient bone distal to the tooth.[3] Huang et al. recommended prompt removal of displaced fragments.[4] Various methods have been proposed for extracting third molars from the infratemporal fossa , such as the Gillies' approach and Orr II. The use of CT can serve as a valuable tool in pinpointing the displaced tooth, helping prevent additional complications during the management process.[5]

CONCLUSION

During the removal of deeply impacted maxillary third molars, it was essential to take additional precautions.

REFERENCE

1. Wasfi KH, Wayzani HN, Aoun G, Berberi NA. Maxillary Third Molar Tooth Accidentally Displaced in Buccal Space: Report of Two Cases. J Dent (Shiraz). 2021 Dec;22(4):308-311.
2. Al Ali HA, Albokhamseen M, Albodbaij M. Displacement of the maxillary third molar into the infratemporal fossa during extraction: A case report. Advances in Oral and Maxillofacial Surgery. 2023 Dec 8:100467.
3. Di Nardo D, Mazzucchi G, Lollobrigida M, Passariello C, Guarnieri R, Galli M, De Biase A, Testarelli L. Immediate or delayed retrieval of the displaced third molar: A review. Journal of Clinical and Experimental Dentistry. 2019 Jan;11(1):e55.
4. Long-sheng FU, Jian-huai HU, Hai-yan LA, De LI, Yue-ming LA, Qiu-yue XI. Removal of Mandibular Impacted Third Molars by Minimally Invasive Extraction and Conventional Technique. A Comparative Study. Journal of Oral and Maxillofacial Surgery. 2017 Dec 28;27(6):410.
5. Battisti A, Priore P, Giovannetti F, Barbera G, D'Alessandro F, Valentini V. Rare Complication in Third Maxillary Molar Extraction: Dislocation in Infratemporal Fossa. J Craniofac Surg. 2017 Oct;28(7):1784-1785.