"EFFECT OF KINESIO TAPING AFTER SURGICAL REMOVAL OF THIRD MOLAR: A RANDOMIZED CONTROLLED TRIAL"

By

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LIST OF ABBREVIATIONS

SR. NO.	ABBREVATIONS	FULL FORM
1.	KT	Kinesio tape
2.	IMTM	Impacted mandibular third molars
3.	POD	Post-operative Day
4.	M	Male
5.	F	Female
6.	PRE-OP	Preoperative
7.	VAS	Visual Analog Scale
8.	RCT	Randomized controlled trial
9.	PI	Pedersons's Index
10.	SG	Study group
11.	CG	Control group
12.	PP	Post operative pain
13.	PE	Post operative edema
14.	PT	Post operative trismus

ABSTRACT

INTRODUCTION

Surgical extraction of third molar is the most difficult procedures described in the field of oral and maxillofacial surgery. Postoperative responses could include swelling and pain and trismus of variable magnitudes, which can significantly reduce the quality of life. Numerous investigations have been hypothesized in this field recently regarding Kinesio taping (KT), a non-invasive means of addressing specific post-surgical problems such as pain, discomfort, oedema and restricted mouth opening. The aim of this study is to study the effect of Kinesio taping post third molar surgery.

MATERIALS AND METHODS

In the ensuing trial, 66 participants split into two groups underwent surgical removal of third molar. Pre operative mean mouth opening and swelling score was evaluated for all the Patients followed by surgical removal of third molars. The study group patients were subjected to Kinesio taping (KT) and both the groups were evaluated for post-surgical pain, swelling and mouth opening on Post Operative Day 2 and Post operative Day 7.

RESULT

On Post operative day 2 and post operative day 7, the Study group's mean pain score was 4.82±7.2 and 1.56±0.50, respectively, while the Control group's average pain value was 7.32±0.81and 2.21±0.69 on Post operative day 2 and post operative day 7, respectively. P values less than 0.05 are considered statistically significant.

On Post operative day 2 and post operative day 7, the study group's post-operative mean swelling score was 129.51±6.61 and 126.09±6.65, respectively, while the control group's mean scores were 142.91±8.64 and 134.99±8.16 on POD 2 and POD 7, respectively. The statistical significance of the p value was demonstrated, with a reported value of less than 0.05.

The average interincisal opening score on Post operative day 2 and Post operative day 7 in the research group was 36.94±8.15 and 40.88±7.31, respectively, while on Day 2 and Day 7 in the control group it was 26.12±4.22 and 36.59±5.47. The statistical significance level, denoted by a p value of less than 0.05, was determined.

CONCLUSION

In conclusion, Kinesio taping has been demonstrated to lessen post-surgical symptoms such as pain, facial edema, and decreased mouth opening.

KEYWORDS

Kinesio taping, Kinesiology, surgical extraction, third molars

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INTRODUCTION

Third molar surgical extraction is a frequent procedure in the maxillofacial field. The quality of life (QOL) in patients after extraction is severely affected due to many complications such as post operative pain, oedema, difficulty in opening mouth of varying degrees which arises due to many inflammatory mediators that occurs during the surgical procedure.[1]

Many clinicians have been using different modalities to reduce these post operative complications. These can be classified broadly into pharmacological and non-pharmacological modalities. During earlier times, corticosteroid was used as an excellent pharmacological agent as it reduces the inflammation to a great extent, however a conclusion in terms of dosage and frequency has not yet reached. Also, many researchers have concluded that there are many side effects related to corticosteroids and hence a lot of clinicians have shifted towards other modalities. [2]

Photo-biomodulation therapy, cryotherapy, manual lymph drainage, placement of surgical drain, platelet rich plasma are some of the non-pharmacological modalities that have been frequently used by the clinicians. However, these modalities may cause discomfort and sometimes may not be cost effective which can hinder its benefit to patients. [3]

Kinesio tape (KT) is an effective therapeutic bandage that is widely used in the field of physiotherapy. It was invented by Dr Kase in 1970s and since then have been used in the treatment of knee, shoulder and various cases of osteoarthritis.[4] It helps in improving the lymphatic and blood circulation by lifting up the skin, thus improves lymphatic congestion and reduces swelling and pain. Taping stimulates the peripheral nerve fibers and minimizes the nociceptive pain stimulus. [3]

These days, it is extensively researched and used on patients undergoing a range of treatments, including orthognathic surgery and maxillofacial trauma. Numerous studies have also been carried out in which researchers evaluated the impact of KT in reducing post-operative symptoms; nevertheless, there is a dearth of scientific evidence supporting its effectiveness.

The aim of the study is to determine whether Kinesio tape can reduce the post-operative morbidity associated with the extraction of third molars. According to our theory, KT has a beneficial effect in lowering post-surgical problems. The study examined three parameters: mouth opening, facial edema, and post-operative discomfort.

AIM AND OBJECTIVES OF THE STUDY

AIM: To study the effect of kinesiology taping (KT) after surgical removal of Impacted mandibular third molar (IMTM).

OBJECTIVES:

- To assess the postoperative pain (PP) on using Kinesio taping after surgical removal of impacted mandibular third molars.
- To assess the postoperative edema (PE) on using Kinesio taping after surgical removal of impacted mandibular third molars.
- To assess the postoperative trismus (PT) on using Kinesio taping after surgical removal of impacted mandibular third molars

REVIEW OF LITERATURE

1. **Ana Carolina et al** in 2020 published an article in December 2019 on the assessment of KT being effective in decreasing post-surgical oedema and pain in the individuals undergoing surgical extraction of impacted mandibular third molars in split mouth Patients and concluded that KT is effective in reducing post-surgical pain intensity and oedema after surgical extraction. [5]

2. In a December 2021 article, **Yurttutan et al,** examined the degree of pain, edema, and trismus following third-molar surgery using the web strip Kinesio taping technique. They came to the conclusion that, because the web strip technique of Kinesio taping is a straightforward procedure free of systemic side effects, it can be regarded as a more affordable, less traumatic way of avoiding postoperative morbidity. [6]

3. In January 2021, **Alexandra Jaro´n et al.** published a study examining the impact of KT on the symptoms following third molar surgery. They found that KT application significantly reduces the VAS score on POD 3 and POD 7, and has a significant effect on swelling on POD 3, and significantly affects mouth opening on POD 3 and 7. [1]

4. **Ufuk Tatli et al.** conducted a placebo-controlled trial in May 2020 to examine the impact of KT on lowering post-surgical morbidity. The study found that KT had a good effect on patients following its application. The author also came to the conclusion that patients who received placebo tape experienced similar outcomes to those who did not receive it, proving that placebo taping is ineffective in easing post-operative discomfort. [3]

5. In a January 2018 study, **KHO CHAI CHIANG** et al examined the effects of KT on quality of life following surgical removal of third molar and post-surgical discomfort, oedema, and trismus. According to the author, it's a useful substitute technique for treating post-operative problems. [7]

6. **€Ozg€ur G€ozl€ukl€u** et al published an article in 2020 on comparing different techniques of Kinesio taping methods and its effect on post third molar surgery symptoms and concluded that KT has a positive outcome on reducing post-surgical complications and that the straight ward technique of KT application is a better method with less reported side effects also reported a reduced need of post operative analgesic. [4]

7. In a 2018 study, **Aysenur Genc** et al compared the effectiveness of KT and a surgical drain in lowering post-surgical morbidity following the removal of a third molar surgically. They found that while both treatments had drawbacks, surgical drains were more effective overall. [8]

8. In a 2020 paper**, Min-Gyu Kim et al.** examined the impact of KT following the excision of a mandibular jaw cyst and found that it is useful in minimizing surgical swelling following cyst excision as well as other procedures carried out in the oral and maxillofacial areas. [9]

9. In a 2018 paper, **Danuta Lietz-Kijak et al**. examined the impact of KT on minimizing postoperative symptoms following orthognathic surgery. They found that KT is beneficial in decreasing swelling and concluded that it is effective. They also said that KT is a cost-effective substitute because it has fewer side effects. [10]

10. In a 2017 study, **Maria Carmen Puerma-Castillo et al**. examined the effectiveness of KT as a supplement to traditional therapy for quality of life, pain, and cervical range of motion in patients who had reported with neck pain. They found that while patients were advised to engage in physical exercises to improve neck stiffness and mobility, Kinesio tape did not provide any additional benefits. [11]

11. **Oliver Ristow et al**. published a paper in 2014 regarding the efficacy of KT in lowering post-surgical morbidity following maxillofacial procedures. The authors found that KT is a cost-effective, non-traumatic procedure that can be utilized extensively to lower post-surgical morbidity following the majority of oral and maxillofacial procedures.[12]

12. In a 2020 study**, Aras Erdil et al.** evaluated the effects of dexamethasone, Dex ketoprofen, trometamol, and therapeutic elastic bandages on symptom and reduction following third molar extraction surgery. They also evaluated the quality of life (QOL) of the participants. The authors came to the conclusion that therapeutic elastic bandages can have effects on post-operative inflammation reduction that are comparable to those of dexamethasone. [13]

13. In 2020, **Laura Tornatore** published a study on the efficacy of KT and manual lymphatic drainage combined therapy. She evaluated its effects on patients who had total knee replacement surgery for post-operative edema, pain, and knee range of motion. She came to the conclusion that using Kinesio tape in conjunction with manual lymphatic drainage is an efficient way to reduce post-operative pain and oedema that is also less traumatic and economical. [14]

14. In a 2013 study on Kinesio taping, **Oliver Ristow** examined pain, trismus, and post-surgical oedema following reduction of zygomatico-orbital fractures. The author came to the conclusion that KT is a great, atraumatic, and cost-effective procedure that can be used after surgery without causing any major side effects. [15]

15. The effectiveness of star-shaped Kinesio tape (KT) in reducing pain and improving postural control in patients with lower back pain was examined by **Jose Jassi et al.** in a published article. They found that while star-shaped KT does not significantly affect chronic lower back pain, it does result in a significant reduction of 1.3 units, which is not statistically significant. Additionally, the benefits attributed to KT are dependent on external factors rather than the actual parameters of taping. [16]

16. **Mark Ci-En Chan et al.** published a study in 2016 on the efficacy of KT in enhancing postoperative results in anterior cruciate ligament reconstruction surgery. They found that while KT reduces early pain symptoms, it is ineffective in lowering swelling or oedema or in enhancing knee function or range of motion. [17]

MATERIALS AND METHODS

The present study was conducted that included the participants who underwent surgical removal of mandibular third molars with 66 Patients who came across to the Department of oral and maxillofacial surgery, KAHER's KLE VK Institute of dental sciences, Belgaum and gave consent to participate with their free will.

STUDY DESIGN: Randomized controlled trial

STATISTICAL ANALYSIS: The statistical analysis used were

- Descriptive statistical analysis was done for demographic details.
- Chi-square test was done to establish association.
- Krushkal-Walli's test was applied for intra group comparison.
- Post-hoc test was used for intra group comparison.

SAMPLE SIZE ESTIMATION: The sample size was calculated using the formula

$$n = \frac{(Z_{1-\frac{\alpha}{2}})^2 (pq)}{d^2}$$

Where, P=0.90 , q=0.10

- Sample size at 95% confidence interval
- 12% allowed error and 10% attrition
- N = 33 in each group.
- Therefore, the sample size is **66**

All the participants had to meet the following criteria.

INCLUSION CRITERIA: Patients fulfilling the following criteria were included:

- Patients belonging to the category of age ranging from 18-40 years.
- Patients who presented with impacted third molar and a moderate surgical difficulty score on Pederson's index (PI) .
- Patients who have not used any antibiotic/antimicrobial or anti-inflammatory drugs 1 week before the surgery.
- Patients with ASA status I with normal bleeding & clotting times

EXCLUSION CRITERIA: Patients with the following criteria were excluded:

- Participants who refused to give a written consent were excluded.
- Patients with cyst, tumors of odontogenic origin and if it was in relation with impacted tooth.
- Patients with presence of any systemic disorders.
- Patients with smoking habit.
- Pregnant or lactating female Patients.
- Patient with allergy to the tape application (any signs of redness or itching in first 24 hours of application)
- Patients who are bearded and not willing for face preparation.

METHODOLOGY

- The study had 66 participants who were diagnosed with a mandibular impacted third molar based on clinical and radiographical findings and who fullfill the inclusion criteria. The participants were randomly assigned into two groups of 33 each using a computer-generated random allocation system. The assessment of the position of the tooth was done using the Pederson's Difficulty Index (PI) and tooth with a score ranging from 5-6 were selected to include in the study.

- Study participants were categorized into two groups:

Group I: Patients subjected to Kinesio taping after surgery (n = 33)

Group II: Patients who were not subjected to Kinesio taping after surgery (n = 33)

- The position of impacted tooth was assessed using Pederson's Difficulty Index and tooth with a score of 5 to 6 were included in the study.

PRE-OPERATIVE ASSESSMENT:

- Hemoglobin
- Bleeding time
- Clotting time
- Random Blood Sugar
- Orthopantomogram/ Intra-Oral Periapical radiograph

ARMAMENTARIUM AND MATERIALS: (as shown in Figure-1)

- Surgical gloves
- Mouth mirror
- Dental explorer
- 2ml Disposable Syringe
- Gauze piece
- Surgical scalpel blade no. 15
- Straight elevator
- Artery forceps
- Curette
- Bone file
- Needle holder
- Adson's tissue forceps
- Scissors
- Surgical handpiece and bur
- Irrigation syringe 20ml
- Surgical drape
- Towel clip
- Suction tip
- Tweezer
- Langenbeck retractor
- Sponge holder
- Periosteal elevator
- Kinesio Tape (as in figure 2)

Figure 1 – Armamentarium

Figure 2 – Kinesiology Tape

Follow up: was done on the 2nd and 7th day of surgical extraction of third molar

SURGICAL PROTOCOL FOLLOWED DURING THE RESEARCH

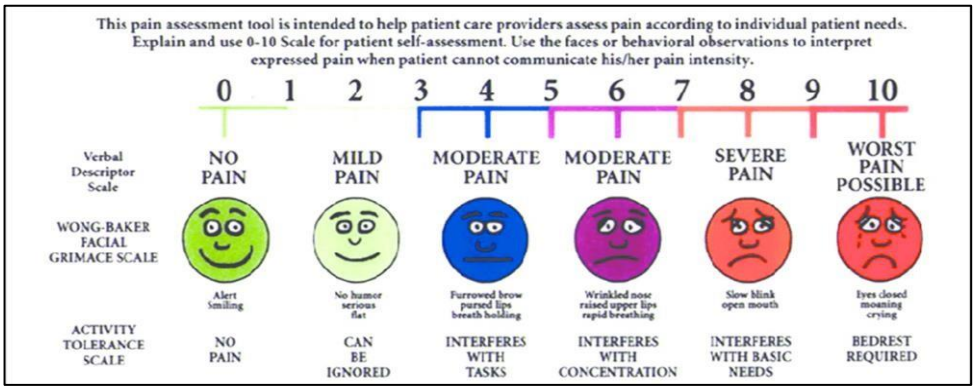
- Assigned Patients were divided into two group using a computer-generated random allocation.
- Patients underwent surgical procedure in the department by the same experienced surgeon.
- Preoperative inter incisal mouth opening and facial swelling was noted.
- A nerve block was given using a 2% lignocaine with 1:80000 adrenaline to produce a regional anesthesia.
- Full thickness mucoperiosteal flap was raised, followed by osteotomy and odontotomy performed using a straight handpiece and bur under abundant saline irrigation.
- After the completion of the extraction, a thorough curettage of socket with bone filing was done.
- Flap was sutured using 3-0 silk suture material and all the Patients received post operative instructions.
- In study group using the submandibular region as a fixed point, the tape was placed tangentially to the base of the jaw from the test side's labial commissure region to the region beneath the lobe of the ear. The tape was cut into 5 strips, all of them as one centimeter thick, and all of the edges were rounded. A fixed 5-cm point will be formed.
- Patients in both the groups received tablet IBUGESIC PLUS SOS.
- Patients were recalled on 2^{nd} and 7^{th} postoperative day (POD) for follow up and was evaluated for post-surgical pain, swelling, and trismus.
- Post operative rescue analgesics were recorded from post operative day 1 to day 5.
- Suture removal was done on post operative day 7.

EVALUATION CRITERIA

PAIN

Patients were provided with a Visual Analogue Scale Visual (VAS) with a score of 0-10.

Score	Intensity of pain
0	No pain
1-3	Mild pain
4-7	Moderate pain
8-10	Severe pain



TRISMUS

- Mouth opening was checked by measuring the inter-incisal distance in millimeters with a caliper.

SWELLING

To evaluate the swelling, distance between corner of the eye and the angle of mandible, tragus and corner of the mouth, tragus and the soft tissue pogonion on the side of surgery was measured using a ribbon ruler.

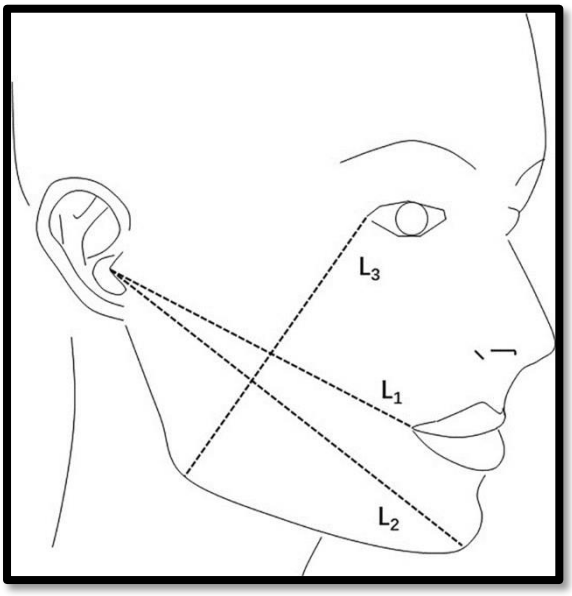


Figure 3 - Edema measurements:

Three linear distances for four fixed anatomical Points: 1 - distance between corner of the eye and the angle of mandible, 2 - tragus and corner of the mouth, 3 - tragus and the soft tissue pogonion.

FOLLOW UP

Pain, mouth opening and swelling was assessed on the day of surgery, 2nd day and the 7th day post-operatively.

PATIENTS IN STUDY GROUP I

Figure 4 - Pre-operative photos study group I (case)

Figure 4a - Profile photo

Figure 4b - Lateral profile

Figure 4c - Measurement from tragus to soft tissue pogonion

Figure 4d - Measurement from tragus to corner of mouth

Figure 4e - Measurement from Lateral Canthus to Angle of Mandible

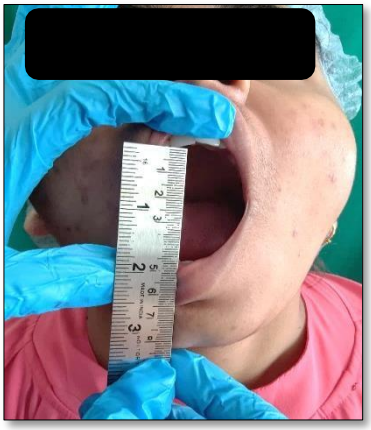


Figure 4f - Measurement of Inter-incisal distance

Figure 5 – Post operative day 2 photos study group I (case)

Figure 5a - Profile photo

Figure 5b - Lateral profile photo

Figure 5c - Measurement from tragus to soft tissue pogonion

Figure 5d - Measurement from tragus to corner of mouth

Figure 5e - Measurement from Lateral Canthus to Angle of Mandible

Figure 5f - Measurement of Inter-incisal distance

Figure 6 - Post-operative day 7 photos study group I (case)

Figure 6a - Profile photo

Figure 6b - Lateral profile photo

Figure 6c - Measurement from tragus to soft tissue pogonion

Figure 6d - Measurement from tragus to corner of mouth

Figure 6e - Measurement from Lateral Canthus to Angle of Mandible

Figure 6f - Measurement of Inter-incisal distance

RESULTS

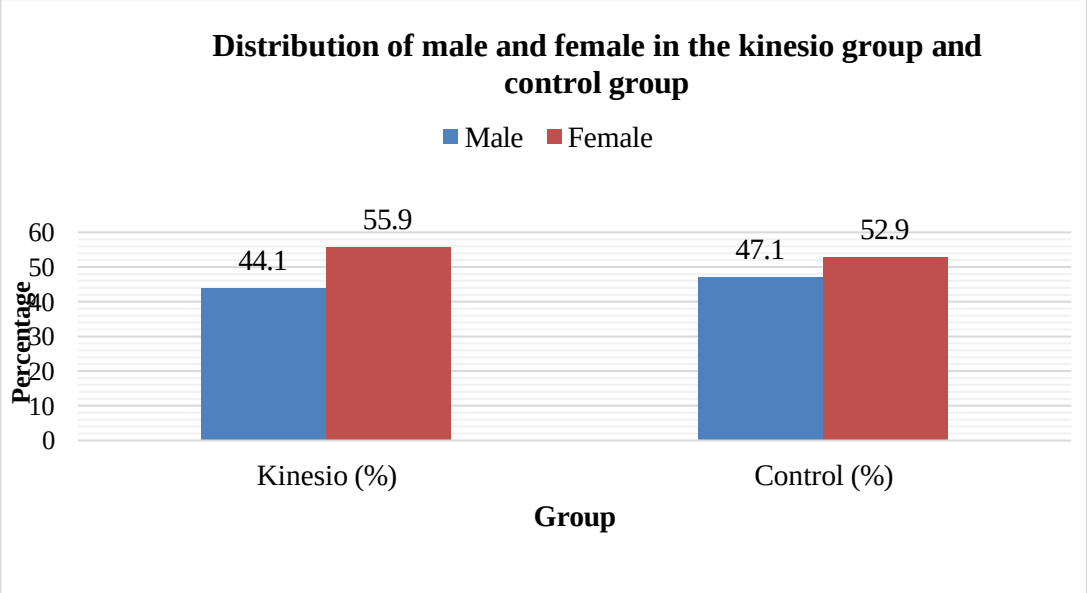
Table 1: Distribution of male and female participants in Kinesio and control group

	Kinesio Group		Control Group	
Sex	**n**	**%**	**n**	**%**
M	15	44.1	16	47.1
F	19	55.9	16	52.9

OBSERVATION

Table 1 provides the distribution of the males and female participants in the Kinesio and control group. The male population was 15 and 16 in the test and control group respectively whereas the female population in the test group was found to be 19 and in control group was 16. There was no statistically significant association between them at the baseline.

GRAPH 1: Distribution of male and female participants in Kinesio and control group



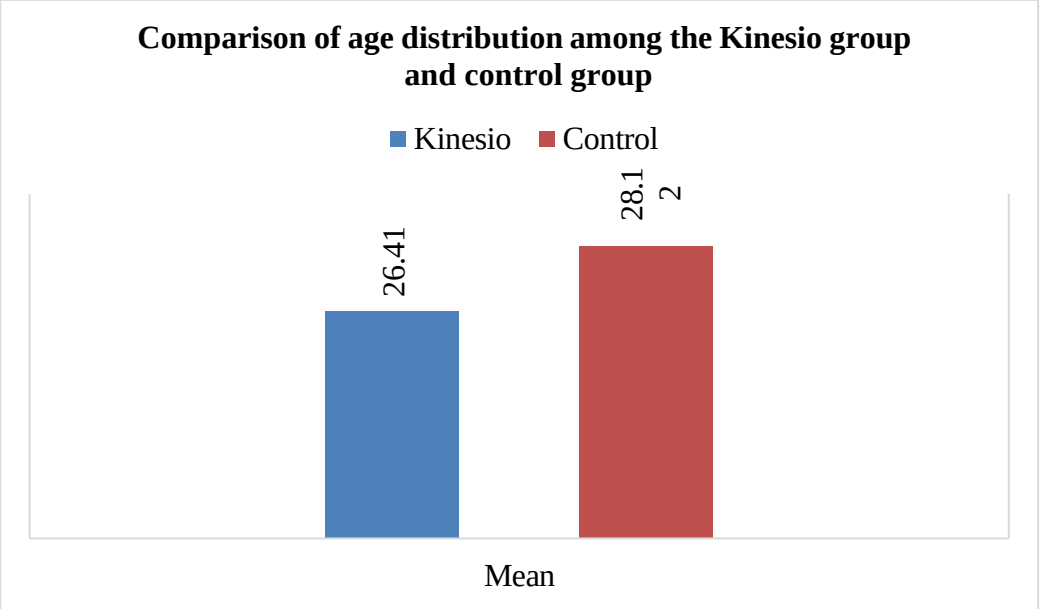
AGE DISTRIBUTION:-

Table 2: Age distribution among the Kinesio group and control group using Kruskal-Wallis test

Age Distribution						
Group	N	Mean	SD	SE	H Value	P Value
Kinesio	33	26.41	5.17	0.89	2.95	0.086
Control	33	28.12	6.40	1.61		

Table 2 provides the mean age in the Kinesio group and control group was found to be 26.41±5.17 and 28.12±6.40 respectively. The comparison between them were not found to be statistically significant (p=0.086) which denotes no baseline difference between the two groups.

GRAPH 2: Comparison of age distribution among the Kinesio group and control group



PEDERSON INDEX:-

Table 3: Comparison of Kinesio group and control group with mean Pederson's difficulty index scores by Kruskal-Wallis test

Pederson Index						
Group	N	Mean	SD	SE	H Value	P Value
Kinesio	33	5.44	0.50	0.09	0.058	0.809
Control	33	5.47	0.51	0.09		

Table 3 provides the mean, standard deviation and standard error values of Pederson's difficulty index for the two groups and also compares them using Kruskal-Wallis test. The mean Pederson's index was 5.44±0.50 in test group and was 5.47±0.51 in the control group. P value is 0.809 and was not found to be statistically significant, hence there was no association found at the baseline.

GRAPH 3: Comparison of Kinesio group and control group with mean Pederson's difficulty index

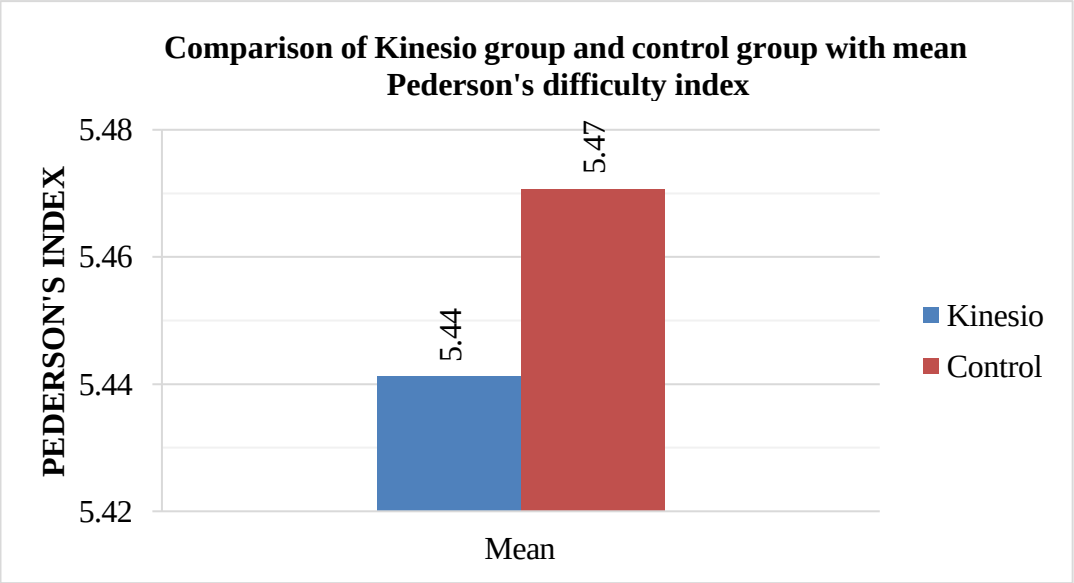


Table 4: Comparison of Kinesio group and control group with mean Pederson's difficulty index

	Kinesio Group		Control Group	
Pederson Index	**n**	**%**	**n**	**%**
5	18	55.9	17	52.9
6	15	44.1	16	47.1

Table 4 provides the descriptive results of the Pederson's difficult index as well as the comparison between Kinesio and Control group using Chi- Square test. 18 patients of Kinesio group and 17 patients of control group had a Pederson difficult index score of 5 respectively. The score of 6 was seen in 15 patients using Kinesio group, and 16 patients of control group.

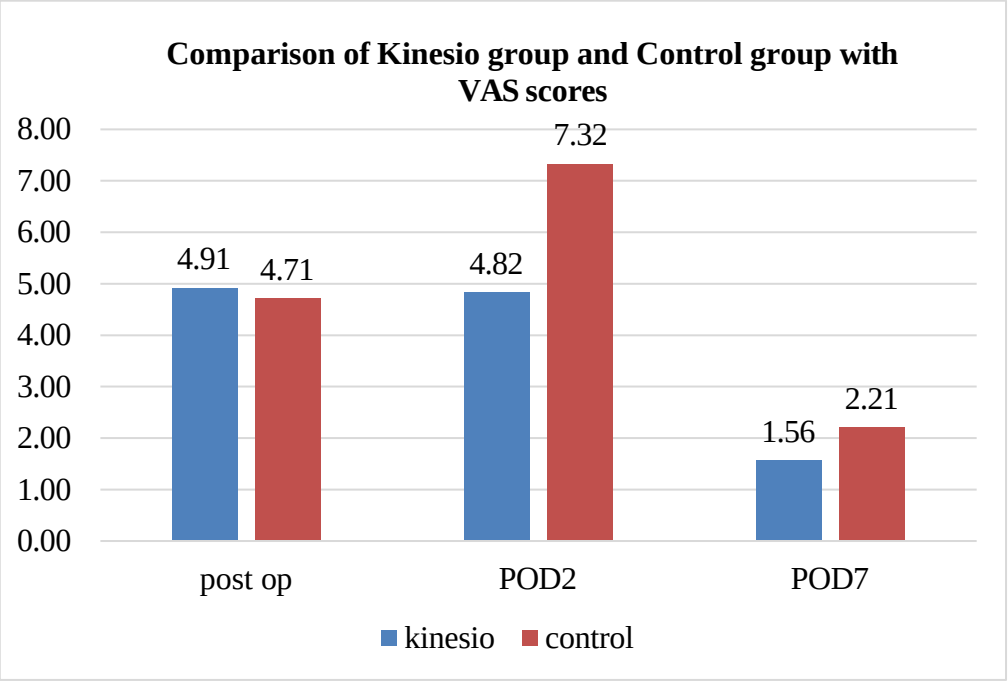
ASSESSMENMT OF PAIN:

Table 5: Comparison of Kinesio group and Control group with VAS scores at immediate post operative, post-operative 2nd day & 7th day using Kruskal-Wallis test.

	Group	N	Mean	SD	SE	H Value	P Value
Post op (pain vs)	Kinesio	33	4.91	0.71	0.12	1.455	0.228
	Control	33	4.71	0.68	0.12		
Pod 2 (pain vs)	Kinesio	33	4.82	0.72	0.12	48.012	0.045
	Control	33	7.32	0.81	0.14		
Pod 7 (pain vs)	Kinesio	33	1.56	0.50	0.09	14.782	0.041
	Control	33	2.21	0.69	0.12		

The comparison of Pain, using mean VAS score, between Kinesio and control group, at different time points was conducted using Kruskal-Wallis test and depicted in Table 5. The mean score was 4.91±0.71 and 4.71±0.68 in the SG and CG on immediate post operative day. The score was 4.82±0.72 and 7.32±0.81 in the SG and CG on POD 2 and 1.56±0.50 and 2.21±0.69 respectively on POD 7. The p value is <0.05 on POD 2 and POD 7 , stating the statistically significant difference .

GRAPH 4: Comparison of Kinesio group and Control group with VAS scores at immediate post operative, post-operative 2nd day & 7th day using Kruskal-Wallis test.



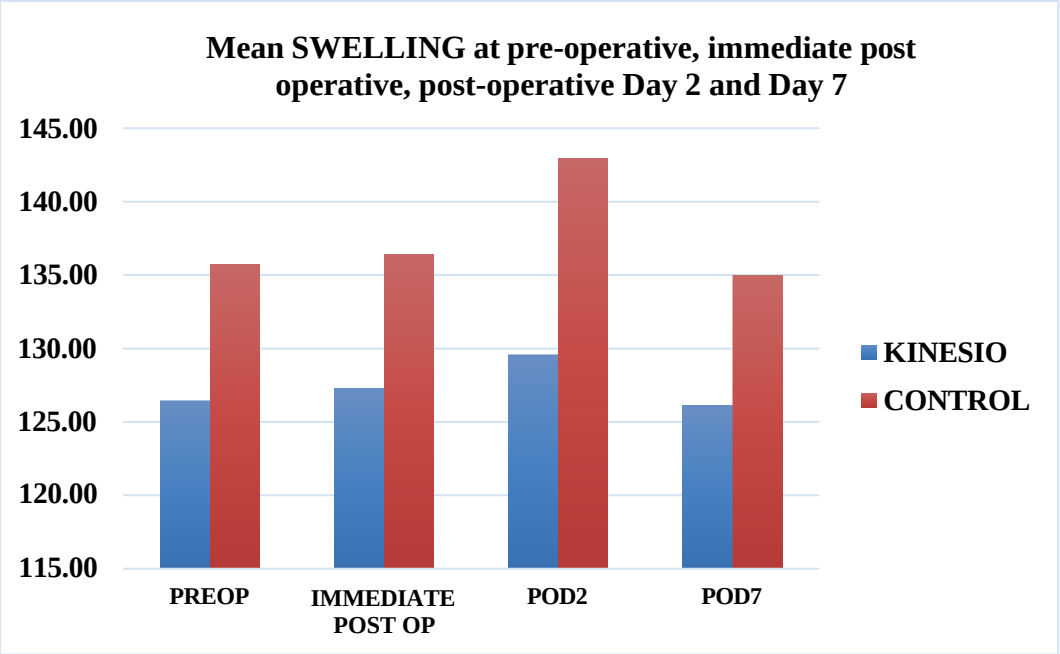
ASSESSMENT OF SWELLING:

Table 6: Comparison of Kinesio group and Control Group with swelling scores at pre-operative, post-operative day 2 and day 7 time points by Kruskal-Wallis test

	Group	N	Mean	SD	SE	H Value	P Value
Pre operative (swelling)	Kinesio	34	126.38	6.63	1.14	18.98	0.112
	Control	34	135.70	8.09	1.39		
post op immediate (swelling)	Kinesio	34	127.29	6.76	1.16	16.73	0.045
	Control	34	136.42	8.18	1.40		
Pod 2 (swelling)	Kinesio	34	129.51	6.60	1.13	31.57	0.043
	Control	34	142.91	8.64	1.48		
Pod 7 (swelling)	Kinesio	34	126.09	6.65	1.14	16.44	0.041
	Control	34	134.99	8.16	1.40		

The comparison of swelling scores between the two groups Kinesio and control was done at four different time points, i.e., at the pre-operative stage, immediate post operative at Day 2 and Day 7, using Kruskal-Wallis test and the results have been provided in Table 7. The mean swelling score was 126.38±6.63, 127.29±6.76, 129.51±6.60, 126.09±6.65 on preoperative, immediate post op, POD2 and POD 7 time points in study group respectively. In control group the mean score was 135.70±8.09, 136.42±8.18, 142.91±8.64, 134.99±8.16 at preoperative, immediate post op, POD 2 and POD 7 respectively. The comparison between these scores showed that swelling was lesser in the study group at all the time points. The p value is < 0.05 at all the time points stating it to be statistically significant.

GRAPH 5: Mean SWELLING at pre-operative, immediate post operative, post-operative Day 2 and Day 7for Kinesio and Control group



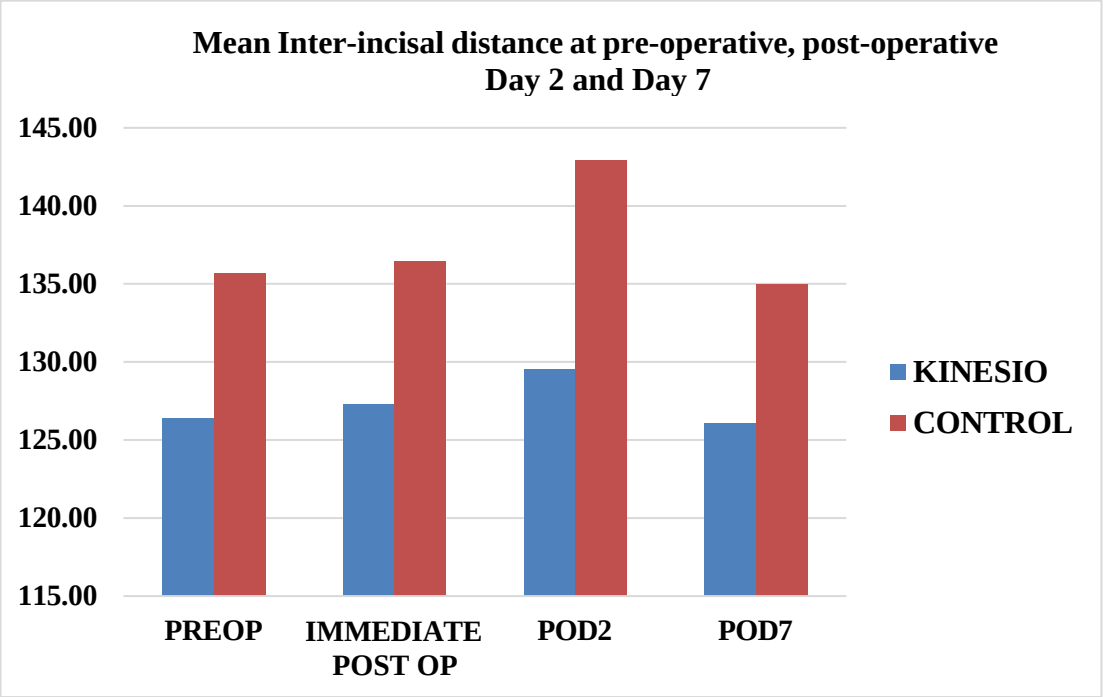
ASSESSMENT OF TRISMUS:

Table 7: Comparison of Kinesio group and Control Group with inter-incisal distance scores at pre-operative, post- operative day 2 and day 7 time points by Kruskal-Wallis test

	Group	N	Mean	SD	SE	H Value	P Value
Pre operative (MMO)	Kinesio	33	42.44	7.56	1.30	6.175	0.013
	Control	33	38.12	5.56	0.95		
Postop immediate (MMO)	Kinesio	33	42.56	7.76	1.33	26.936	0.040
	Control	33	32.47	4.87	0.84		
Pod 2 (MMO)	Kinesio	33	36.94	8.15	1.40	29.055	0.042
	Control	33	26.12	4.22	0.72		
pod 7(MMO)	Kinesio	33	40.88	7.31	1.25	6.519	0.047
	Control	33	36.59	5.47	0.94		

Table 9 describes the results of comparison of inter-incisal distance scores for Kinesio group and control group at pre-operative stage, immediate post operative, Day 2 and Day 7 using Kruskal-Wallis test. In the test group, the mean preoperative mouth opening was 42.44±7.56, while in the control group, it was 38.12±5.56. The test group's mean mouth opening was 42.56±7.76, 36.94±8.15, 40.88±7.31 on the immediate post-op, POD 2, and POD 7, while the control group's mean mouth opening was 32.47±4.87, 26.12±4.22, and 36.59±5.47 on the same dates. On POD 2, POD 7, and the immediate post-operative period, a statistically significant p value less than 0.05 was discovered.

GRAPH 6: Mean inter-incisal distance at pre-operative, post-operative Day 2 and Day 7 for Kinesio and Control



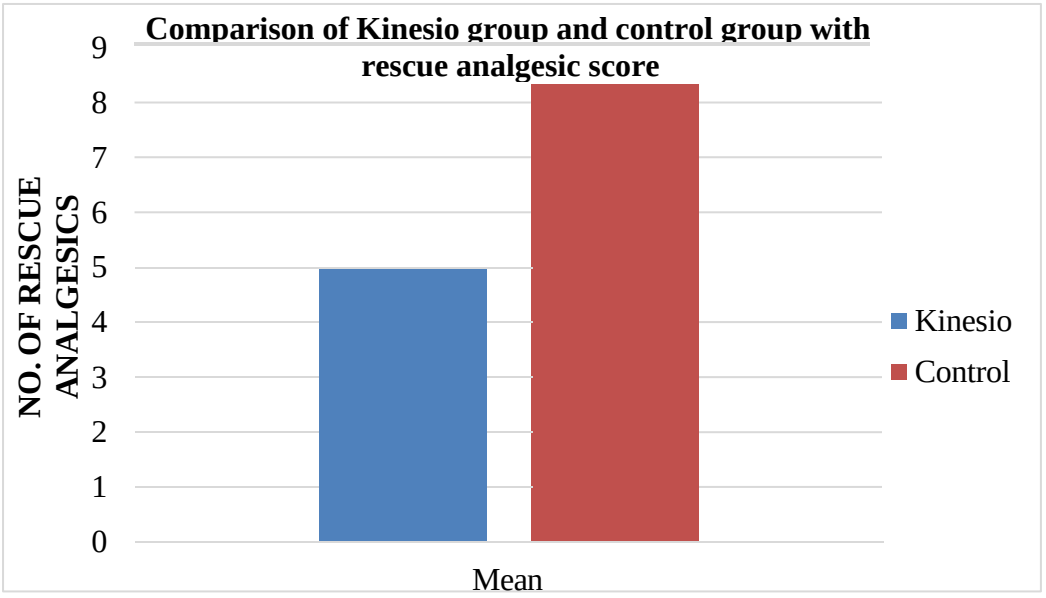
ASSESSMENT OF RESCUE ANALGESICS (IBUGESIC PLUS)

TABLE 8: Comparison of Kinesio group and control group with rescue analgesic score from POD1 to POD 5

Group	N	Mean	SD
Kinesio	33	4.94	1.14
Control	33	8.33	1.65

Table 8 depicts the number of rescue analgesics that was taken by the patients from post operative day 1 to post operative day 5. In the control group, the average number of rescue analgesics taken was 8.33, nearly twice as many as the 4.94 analgesics taken by patients in the test group.

GRAPH 7: Comparison of Kinesio group and control group with rescue analgesic score from POD1 to POD 5



DISCUSSION

Surgery for the third molar is recommended when there is severe discomfort, edema, or infection. General anesthesia or intravenous sedation may be used for the surgical removal, depending on a number of factors including the degree of difficulty, any known or expected complications, the patient's anxiety, and the experience of the surgeon. [18]

Over the years various techniques have developed for the managing the complications related to surgical removal of third molars. Initially the management was more of pharmacological such as use of antibiotics and corticosteroids.

A comprehensive analysis by Parastoo Parhizkar et al. [19] that comprised 12 research came to the conclusion that using corticosteroids as an adjuvant can lessen the difficulties that follow third molar extraction surgery.

Some authors have suggested the use of different techniques of flap elevation, modifications of primary closure have shown results of reduced complications [20]

When compared to conventional techniques, the use of lasers and piezoelectric technology has also demonstrated to lessen the difficulties that follow surgical removal of third molar. According to a published study by Mahmut Koparal et al., 45 patients were assessed for the efficacy of single dosage and two doses of laser treatment (LLLT), and the results showed that laser is helpful in lowering edema, pain, and difficulty opening the mouth after surgery.[21]

Dr. Kenzo Kase in 1970s had first introduced the Kinesio tape. This tape is made up of 100% gentle cotton fiber with medical grade acrylic adhesive, it is latex free, hypoallergenic, and completely water resistant. It has shown to help in the

removal of any lymphatic oedema and congestion by lifting the skin, allowing movement of the lymph. It reduces the inflammation, prevents injury, and promotes good circulation and healing. [22]

Kinesio tape is being commonly employed in sports medicine to treat traumatic injuries. It enhances the drainage of the lymphatic system by elevating the skin and directing the lymph flow from areas of high pressure to those of low pressure.[3]

This study includes studying the effect of KT in reducing the sequalae of post-surgical complications after third molar surgery. With this regard, the study had included three parameters pain, facial swelling, and mouth opening. According to literature, within 48 hours of using taping therapy, there was a reduction in edema on the KT side of approximately 90%, and participants reported a significant decrease in oedema levels by the second day after surgery. [5] According to Ristow et al. (2013, 2014, 2014), patients who received taping therapy experienced a 60% reduction in oedema after the second postoperative day.[12]. In our study, we observed that swelling in the study group was 43% less than swelling seen in study group.

The study's findings demonstrated a statistically significant decrease in facial oedema on POD 2 (129.51±6.60) compared to the control group (126.09±6.65), with a p value of less than 0.05. Additionally, a significant improvement in swelling reduction was observed on POD 7 (126.09±6.65) in the study group compared to the control group (134.99±8.16).

With a p value of less than 0.05, the study's results showed a statistically significant decrease in facial oedema on POD 2 (129.51±6.60) as compared to the control group (126.09±6.65). Furthermore, on POD 7, the study group showed a substantial improvement in swelling reduction (126.09±6.65) as compared to the

control group (134.99±8.16).

On the POD 2, the pain score was 4.82±0.72 in study group and 7.32±0.81 in control group, and on POD 7 the pain score was 1.56±0.5 and 2.21±0.69 in study and control respectively. These results were found to be significant and less than 0.05 on both day 2 and day 7.

Our study's findings were also found to be comparable to those of Ana et al.'s split mouth investigation, which revealed that KT is a useful strategy for lowering post-operative problems following third molar surgery [5].

Nevertheless, it was found to be at odds with a study by Genc et al. [8] that found surgical drain to be more effective than KT.

Yurttutan et al's study from 2021 examined the degree of pain, edema, and trismus following third-molar surgery using the web strip Kinesio taping technique. They came to the conclusion that, because the web strip technique of Kinesio taping is a straightforward procedure devoid of systemic side effects, it can be viewed as a less traumatic and more cost-effective means of preventing postoperative morbidity.[6]

In January 2021, Aleksandra Jaro´n[1] et al. published a study examining the impact of KT on the symptoms following third molar surgery. They found that KT application significantly reduces the vas score on POD 3 and POD 7, has a significant effect on swelling on POD 3, and significantly affects mouth opening on POD 3 and 7.

Ufuk Tatli et al.[3] conducted a placebo-controlled study in May 2020 to examine the impact of KT on lowering post-surgery morbidity following surgical removal of third molar. The study found that KT had a good effect on patients following its application. The author further concluded that the effects of placebo taping were comparable to those of patients who did not receive taping, indicating that placebo taping is ineffective in easing post-surgical discomfort.

Kinesio taping has also shown promise in lowering issues that arise after surgeries such cyst enucleation and orthognathic surgery. Our results, however, were not in line with Oliver Ristow's study, which examined the effectiveness of KT in lowering postoperative pain and swelling following ORIF of mandibular fractures. According to Ristow's research, Kinesio tape had no appreciable effect on pain relief. [23]

Kinesio tape exhibits elasticity and allows for movements. A 2021 survey that was published in international journal of sports physical therapy found that Kinesio tape is being used for post injury treatments, that helps lessen pain. The major drawback in using this tape could be skin irritation or itchiness. Some Patients may report blisters and skin damage. However, in our study none of the Patients reported any skin damage or irritations. [24]

CONCLUSION

- The study concludes that Kinesio taping is effective in reducing post-operative symptoms, specifically pain, edema, and trismus following third molar surgery.
- It is extremely therapeutic and ought to be taken into consideration for use in other surgical procedures in order to fully realize its benefits.

LIMITATION

- The limitation of the study include its small size of sample and the absence of a split-mouth design study, further studies are required to reduce any discrepancy that may have been caused due to different participants in control and study group.

- It is also important to evaluate the placebo effect of this taping in interpreting the results, hence a subsequent evaluation considering the placebo effect should be done.

RECOMMENDATION

- Kinesio Taping can be used routinely as a post operative adjunct therapy after surgical extraction of lower third molar, as it increases patient comfort, controls swelling, alleviates pain and trismus in the immediate post operative period.

SUMMARY

The present study was a clinical randomized control trial consisting of 66 Patients in total segregated in groups of two: group I (Kinesio group) and group II (control group). After a preoperative evaluations and measurements, the surgical extraction of the impacted third molar was done. Follow up period was on post operative day 2 and post operative day 7 for both the groups. The analysis included three parameters: pain, swelling, and trismus. A significant reduction, indicated by a p-value less than 0.05, was observed in all three parameters. The Patients in the study groups responded well as compared to the control group. These findings conclude that KT is an effective tool to decrease post-surgical morbidity and can be used as an adjunct to other therapies after the third molar surgery.

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ANNEXURES - I ETHICAL CLEARANCE

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Sl. No. : 1580

CERTIFICATE

EC/NEW/INST/2021/2435
Research & Ethics Committee

This is to Certify that the synopsis titled

Effect of kinesio taping after surgical removal of third molar : a randomized controlled trial

Submitted by

Dr. _____ *P. G. Student /*

Staff, Guided by _____ *from Department of*

Oral and Maxillofacial Surgery *has been critically evaluated by committee members and granted ethical clearance to conduct the above mentioned study*

Date : 30/3/24

Member Secretary
Research and Ethical Committee
KLEVK Institute of Dental Sciences
Belagavi

MEMBER SECRETARY
Research & Ethical Committee
KLEVK Institute of Dental Sciences
BELAGAVI.

Chairman
Research and Ethical Committee
KLEVK Institute of Dental Sciences
Belagavi

Chairman
Research and Ethical Committee
KLE VK Institute of Dental Sciences

ANNEXURES - II BIOSTATISTICS CLEARANCE CERTIFICATE

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Biostatistics Clearance Certificate

This is to certify that the Biostatistics aspect of this dissertation/ Thesis work of e student, under the guidance of Reader, Department of **Oral and Maxillofacial Surgery**, entitled **"Effect of Kinesio taping after surgical removal of third molar: A Randomized controlled trial"** has been done under my guidance and completed satisfactorily.

Place: Belagavi

Date 08-04-24

Name & Signature of Biostatistician
Dr Nagaraj Patil

DEPARTMENT OF EPIDEMIOLOGY & BIOSTATISTICS KAHER'S BELAGAVI

ANNEXURES - III PLAGIARISM CHECK REPORT

Scientific Correspondence and Review Committee

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Date : 10. 04. 2024 Serial No. : 172

PLAGIARISM CHECK REPORT

Name of the Applicant :
UG / PG / Ph.D / Staff : POST GRADUATE
Batch & Year : 2021 - 2024
Department : ORAL AND MAXILLOFACIAL SURGERY

The soft copy of Research Work / Manuscript by .. entitled

"...EFFECT...OF...KINESIO...TAPING...AFTER...SURGICAL..REMOVAL...OF.....
.....THIRD...MOLAR.....-...A...RANDOMIZED...CONTROLLED...TRIAL....."

under the guidance of ....has been submitted for Anti-Plagiarism check to the Scientific Correspondence & Review Committee of KLE VK Institute of Dental Sciences using "Turn-it-in" software.

The scan has been carried out and the scanned output reveals a Similarity Index of .....9...%, which is **within** / **not within** the acceptable limits of 10% as per the UGC guidelines.

10/04/2024

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Chairman
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KLEVK Institute of Dental Sciences
KAHER - Belagavi

ANNEXURE-IV

KAHER's KLE VK Institute of Dental Sciences

Department of Oral and Maxillofacial Surgery Belagavi

"Effect of Kinesio taping after surgical removal of third molar: a randomized controlled trial"

CONSENT TO SURGERY & ANAESTHETICS

Date: Time: a.m./ p.m.

1. **I, aged years have been informed about my involvement in the study.**
2. **I agree to give my personal details like name, age, sex, address, history of treatment taken and any other details required for the study to the best of my knowledge.**
3. **I will cooperate with the surgeon for examination and also for various investigations.**
4. **I permit the surgeon to utilize the information given by me and the results obtained from this study for presentation and publication.**
5. **I permit the surgeon to take my photographs to utilize it for the study and presentation purpose.**
6. **I am participating in this study with my own wish and will and the surgeon has explained the nature and the effect of procedure including usage of kinesio taping on the face after the extraction of third molar surgery in my own vernacular language.**
7. **The nature and purpose of the operation and the materials being used, possible alternative methods of treatment, the risk involved and the possibility of complications have been fully explained to me in my vernacular**

tongue. No guarantee or assurance has been given by anyone as to the results that may be obtained.

8. **I have read and understood the above information given by surgeon about the study and willingly agree to participate in the study and willingly agree to come for follow up on the 2nd and 7th day.**

Name: Date:

Signature: **Mob. No:**

Name of the Doctor:

Doctor's contact:

Hospital contact:

ANNEXURE V

KLE Vishwanath Katti Institute of Dental Sciences, Belagavi Department of Oral and Maxillofacial Surgery

Patient Information Sheet

"Effect of Kinesio taping after surgical removal of third molar: a randomized controlled trial"

Dear Patient,

You are invited to take part in a research study related to the use of different irrigating solution during the extraction of your impacted mandibular third molar to evaluate the postoperative responses. I would like to interview you to ask you about the symptoms of the condition and also perform the surgical procedure on you. This research is a part of a MDS, main dissertation at KLE Academy of Higher Education and Research.

Before you decide whether to take part in the study it is important that you understand what the research is for and what you will be asked to do. Please take time to read the following information and discuss it with others if you wish. It is up to you to decide whether or not to take part in this study. If you decide to take part you will be given this information sheet to keep. You will be also asked to sign a consent form. You can change your mind at any time and withdraw from the study without giving any reason. The standard of care you receive will not change whether or not you decide to participate in this study. You are welcome to contact me if you would like any further information.

The purpose of this research study is to evaluate and compare the efficacy of kinesiology taping after surgical removal of impacted mandibular third molars.

You have been chosen because you have been diagnosed with impacted mandibular third molar needing surgical extraction. The study will involve 66 participants who will be examined and surgical extraction will be performed on them. During this procedure, two different types of taping technique will be used and you will receive either one of them. Irrespective of tape is used after the procedure, I assure you that it will not affect the steps of the procedure, duration and outcome of the planned treatment. Multiple photographs will be recorded during the pre-operative and post-operative stage to compare the changes in the post-operative responses like swelling, pain and mouth opening. You will be asked to report for a review and follow-up visit on 2^{nd} and 7^{th} day after the procedure.

The information gained from this research will be used to publish in scientific platforms/ journals without revealing your identity to make recommendations for the best practice and the results of the study may also lead onto further studies into the management of surgical extraction of impacted mandibular third molar.

I,_____, age_____years, have been explained the details of the study undertaken. I am fully satisfied with the procedure and instructions given by Dr._____and hereby give my permission to participate in this study.

Dr.

Place:

Date: Dept. of Oral and Maxillofacial Surgery

Signature of participant:

Contact no:

Address:

ANNEXURE VI - PROFORMA FOR CASE HISTORY

NAME: **AGE:**

SEX:

OCCUPATION: **O.P.NO.:**

ADDRESS: **DATE:**

CONTACT NO:

CHIEF COMPLAINT:

HISTORY OF PRESENTING ILLNESS:

PAST DENTAL HISTORY:

PAST MEDICAL HISTORY:

DRUG ALLERGY: PERSONAL HISTORY:

Smoking/ Alcohol/ Tobacco chewing

GENERAL PHYSICAL EXAMINATION: EXTRA-ORAL EXAMINATION:

Facial Symmetry: TMJ:

Lymph Node:

Mouth Opening:

INTRA-ORAL EXAMINATION:

- Soft Tissue Surrounding the Impacted Tooth: Normal/ Inflamed
- Ulcer: Present/ Absent
- Fibrosed: Yes/ No
- Pericoronitis:
- Swelling:
- Discharge:
- Pain/ Difficulty in Chewing:

PROVISIONAL DIAGNOSIS: INVESTIGATIONS:

IOPA:

OPG:

Routine Blood Investigation**:**

RADIOGRAPH AND CLINICAL CORRELATION: DIAGNOSIS:

PEDERSONS INDEX:

CLASSIFICATION	**VALUE**
Spatial relationship	
Mesioangular	1
Horizontal/Transverse	2
Vertical	3
Distoangular	4

Depth

Level A: High occlusal level	1
Level B: Medium occlusal level	2
Level C: Low occlusal level	3

Ramus Relationship/Space available

Class I: Sufficient space	1
Class II: reduced space	2
Class III: no space	3

Difficulty index

Very difficult	7-10
Moderately difficult	5-7
Slightly difficult	3-4

TOTAL SCORE:

TREATMENT PLANNING:

DETAILS OF SURGERY:

DATE:

START TIME (INCISION):

END TIME (CLOSURE):

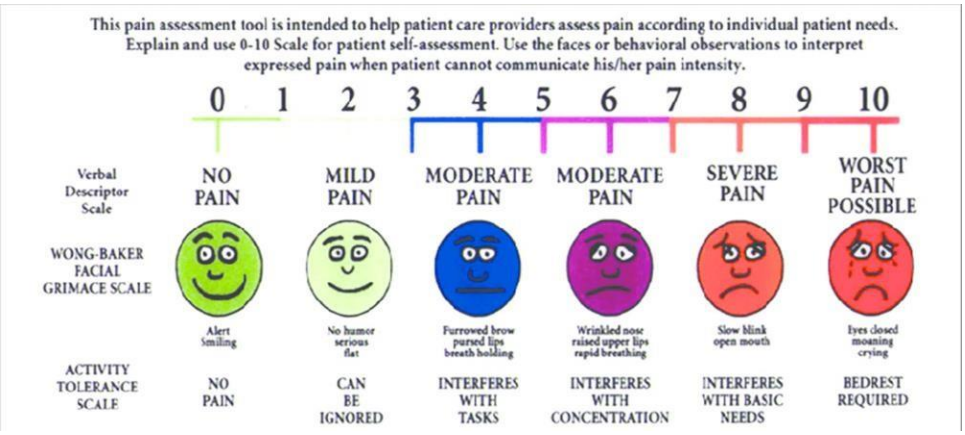
SURGICAL PROCEDURE:

Local Anesthesia: Incision:

Flap:

Method of Extraction: Closure Of Site: **MEDICATION FOLLOW-UP:**

1. PAIN- Visual Analog Scale (VAS)



IMMEDIATE POST OPERATIVE	2nd DAY	7th DAY

2. SWELLING

MEASUREMENT	Preoperative	Immediate post operative	Post Operative day 2	Post operative day 7
The corner of the mouth to the tragus				
The outer canthus of the eye to the angle of the mandible				
The soft tissue pogonion to tragus				

3. TRISMUS

	PRE OPERATIVE	**IMMEDIATE POST OPERATIVE**	**POST OPERATIVE DAY 2**	**POST OPERATIVE DAY 7**
MOUTH OPENING (MM)				

4. PATIENT LOG-SHEET

POD	MORNING	AFTERNOON	NIGHT
1			
2			
3			
4			
5			

COMPLICATIONS:

- ALVEOLAR OSTEITIS
- PARASTHESIA
- DELAYED WOUND HEALING
- INFECTION
- ANY OTHER