"EFFECTIVENESS OF ACUPRESSURE ON PAIN EXPERIENCE DURING INFERIOR ALVEOLAR NERVE BLOCK INJECTION IN CHILDREN AGED 5-10 YEAR OLD - AN EXPERIMENTAL STUDY"

Dissertation submitted to Maharashtra University

of Health Sciences, Nashik

in the Partial Fulfillment of Regulations

for the award of the Degree of

MDS IN

PAEDODONTICS AND PREVENTIVE DENTISTRY

BRANCH VIII

2019-2022

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LIST OF ABBREVIATIONS

Sr.No	Short forms	Long form
1.	LA	Local anesthesia
2.	IANB	Inferior alveolar nerve block
3.	VAS	Visual analog scale
4.	CFSS	Children's fear survey schedule
5.	PFS	Pain faces scale
6.	FLACC	Face, Legs, Activity, Cry and Consolability
7.	A/V	Audio-visual
8.	WITAUL	Writing in the air using legs
9.	TPPPS	Toddler-preschool post-operative pain scale
10.	SD	Standard deviation
11.	MCDAS	Modified Child Dental Anxiety Scale
12.	SEM	Sound, Eye and Motor
13.	WBFS	Wong-Baker Faces pain rating scale
14.	NPSA	Non-Penetrating sham acupuncture
15.	PONV	Post-operative nausea and vomiting
16.	APA	Acupressure analgesic
17.	STAI	State-trait anxiety stock
18.	SAA	Secretion alpha-amylase
19.	HRV	Vital sign variability
20.	AT	Auriculotherapy
21.	SpO2	Oxygen saturation
22.	CI	Confidential Interval

INTRODUCTION

"An appointment is a total failure if a patient leaves in tears, even if the operative dentistry is perfect."

- Mc Elroy 1895

Wright et al. states that all oral healthcare teams should have two main goals: to provide effective and efficient dental treatment as well as to promote a positive attitude in children.

Some dental treatments are associated with pain like dental injections, including extractions, pulpotomies, root canal treatments/ pulpectomies, drainage of abscesses and minor oral surgical procedures, etc. In pediatric dentistry, it is essential to reduce pain, anxiety, and fear induced by local anesthetic injection, in order to obtain the patient's cooperation and achieve a successful treatment. Local

anesthetics, the most potent drug for the prevention & management of pain, are itself associated with pain, which is exacerbated by the anxiety and fear induced by the glance of the needle, which is known as needle phobia/blenophobia. The fear of pain attributed to injection is cited as an obstacle in providing appropriate dental care [(1)].

Hence painless dentistry plays an important role in order to treat efficiently and effectively, especially in the pediatric population. Unfortunately, pain is associated with intraoral local anaesthesia injections during dental treatment. According to studies, about 14% of 4 to 11-year-old children are anxious while visiting a dental clinic, with injections being their biggest fear. Inadequate measures to deal with the pain caused by local anaesthesia may result in a negative dental experience, which may lead to dental fear and anxiety, as well as future avoidance of dental treatment [(2)] .

There are several methods for reducing pain during local anaesthetic injections, including the use of topical anaesthetics (e.g., Benzocaine) [(3)], heating up the local anaesthetic agents [(4)], buffering local anaesthetics [(5)], adjusting the rate of infiltration [(6)], slowing down the injection speed, counter-irritation [(7)], & distraction technique [(8)]. Furthermore, using a mechanical delivery system, vibrating the adjacent tissue while administrating the injection, by applying pressure at the injection site have also been tried to reduce pain experienced in during administering of dental anaesthetic agents [(8)].

Acupuncture, one of the ancient Chinese medicines, was introduced as a way to incorporate alternative techniques into clinical practice. The technique is based on the idea that the body's vital energy, known as Qi (pronounced "chee"), circulates

unidirectionally throughout an intricate network of channels (meridians) just beneath the skin. Acupuncture is used to alter the flow of Qi in various ways to stimulate a therapeutic effect. There seem to be specific areas from head - to - toe, & the point of treatment is to alter the flow of Qi in various ways to stimulate a therapeutic benefit [(9)]. Acupoints are the specific points in which Qi gathers, within which thin metal needles are incorporated to induce various effects, and this approach is known as Acupuncture. Acupuncture works by triggering the nervous system, modifying how it processes pain signals, & releasing natural painkillers like serotonin and endorphins into the nervous system [(10)].

Asthma, insomnia, anxiety symptoms, & general disorder can all benefit from this technique. It also helps with dental anxiety, gag reflex, temporomandibular joint disorders, dentofacial pain, and xerostomia, among other things [(10)]. As per a systematic review, acupuncture is efficacious for many different types of anxiety in many various populations, but the significant drawback attributed with acupuncture is a bacterial infection outbreak caused by improper sterilization and reusable needles [(11)]. Acupressure arose as a result.

Acupressure is non-invasive form of acupuncture that produces the same results as acupuncture but is more suitable for children. These methods involve manually stimulating acupoints or using a variety of tools, such as derma rollers, magnetic point inducers, or seeds of vaccaria [(12)].

Acupressure has been shown to help with anxiety, nausea, & vomiting during pregnancy, spinal anaesthesia, laparoscopic procedures, & the treatment of TMJ disruption in studies [(13)]. Acupressure is also useful in the medical and dental fields

for reducing stress and raising pain thresholds. Acupressure has also been suggested as a method of reducing dental anxiety in children enduring scaling & restorative procedures [(12)].

Sparse data is available on the effect of acupressure over pain of local anesthetic injection in children. Hence the goal of the study was to assess the effect of acupressure on pain of local anesthetic injection in children.

AIM AND OBJECTIVE

AIM:-

To evaluate the effect of acupressure on pain experience during inferior alveolar nerve block injection in children aged 5-10 years old.

OBJECTIVE:-

1. To evaluate the effect of acupressure on pain experience during inferior alveolar nerve block injection in children aged 5-10 years old.

2. To compare the effect of acupressure with non-acupressure on pain experience during inferior alveolar nerve block injection in children aged 5-10 years old.

REVIEW OF LITERATURE

Article related to pain in children

Shepherd M, Nadanovsky P and Sheiham A [1999] [(14)] examined the prevalence & intensity of pain during dental treatment through eight-year-old school children in the survey, as well as the effect of dental pain on the patient's and their parent's daily lives. The study included approximately 2,300 eight-year-old kids from primary schools of 34 states. A quota-based sampling procedure of school systems from all Harrow postcode areas was used. Interview questions with the children were utilize to collect data. The prime outcome measures were the prevalence of toothache history, the predominance of toothache in the past four weeks, the predominance of pain with in previous 4 weeks that tends to result in a visit to the dentist, the cessation of trying to play, having to eat, sleep, going to school, and the use of analgesics. An author came to the conclusion that the onset and impact.

Milsom KM, Tickle M and Blinkhorn AS [2002][(15)]examined the relationships among dental pain (its consequences) and the strength of restorative care given for deciduous molars in children reported to general dentist on a regular basis. The study included 677 kids with caries reported to 50 general dentists on routine basis. Data from the study were aggregated and evaluated at the clinical bedside. Children with a note in their case record format implying pain affiliated to their own mandibular teeth, children who might have gone through a lot extraction with one or so more primary molars due to pain or abscess, and children who received one or more months of treatment were all given frequency distributions. They found that approximately half of the children with in survey (48%) had least one pain symptom. Total primary dentition decay was a significant predictor of pain, expulsion due to pain or sepsis, & antibiotic prescription. There was no significant relationship between any of the dependent variables and the proportion of carious teeth restored. The study concluded that dental pain is a common condition in children who visit their general dentist on a regular basis and have decay in their anterior primary dentition.

Kuscu O and Serap A [2008][(16)] studied the effect of anxiety & the category of dental infusion, a plastic needle or an electronic computerized device, on pain perception in children was studied. The study involved 41 children aged 9 to 13-years old who were enrolled for treatment just at the Medical Faculty in Istanbul. The selection process was primarily intended to form a study group comprised of both anxious and non-anxious children. 2 dental injectors were compared: a computerized device (Wand®, Landmark Living-stone, America) & a regular plastic syringe. Anxiety levels were determined using the Children's Fear Survey Subscale, the Facial

Image Scale, and State Anxiety Indicator for Children, and heart rates. Random assignment was used to assign participants to interventions. The very first appointment was intended to be an introductory familiarization session, and injections were given in the 2nd and 3rd sessions, with either injector. This same VAS was used to measure pain following injections. There were no significant differences in infusion pain ratings amongst the Wand and the traditional plastic injector. As a result, the researcher concluded that higher limits of pre-injection anxiety were associated with severe pain reports from the children. Anxiety plays a key role in children's pain reactions and has been discovered to be more influential in pain sensitivity than the preferred injection devices.

Aminabadi NA, Farahani RMZ and Balayi Gajan E [2008][(17)] evaluated the effectiveness of distraction &counter stimulation in reducing anesthetic injection pain in pediatric dental patients was investigated based on the hypothesis that diversionary tactics may minimize the CNS component of pain perception and counter stimulation may help counter the local sensory element of pain. The current randomized clinical trial included 78 children aged 4 to 5 yr (mean age: 4.72 yr old) with carious primary molar teeth requiring an IANB block. The subjects were divided into three groups at random. Topical anesthesia was administered to Group SA, accompanied by an IAN block (simple anesthesia). In relation to a Group SA protocol, Group C+SA received reverse stimulation via intraoral and maxillofacial finger vibration. In group 2 (Group C+SA), counter-stimulation (C) of an injection area was added in addition to the various protocols. The response stimulation method involved lightly vibrating tissue neighboring to the intraoral injection site with the thumb and lightly vibrating a comparable extra oral site with the forefinger. The

vibration movement range was roughly 1 mm (small back and forth/up & down movements) as well as the vibration frequency was 1 cycle/sec. The injection procedure for group 3(Group CD+SA) was comparable to that of Group C+SA, but this group also received a distraction exercise. The clinician instructed these subjects to start raising one‘s alternative legs in unison in a monologues voice. The pain response was quantified using the (SEM) scale. A way ANOVA was used to analyze the data (ANOVA). As a result, the SEM scores in Groups SA, C+SA, and CD+SA, respectively, were 8.25, 5.07, and 3.41. An extreme pain reaction occurred in SA Group SA but maybe not in both these groups, according to the SEM scale. Group SA's pain response was substantially higher than the other two groups (P0.05). Furthermore, the subject matters in Group CD+SA reported significantly less pain than those in Group C+SA. Because of the exaggerated pain response, they asserted that simple management of local anesthetic in pediatric dental patients is just not feasible. In a clinical setting, both distraction and counter-stimulation are successful in reducing pain reactions. However, using both variant simultaneously to accomplish more favorable results in terms of reducing pain response in pediatric dental treatment may be more plausible.

Versloot J, Veerkamp J and Hoogstraten J [2008][(18)] evaluated by comparing the anxiety & dental pain responses of children who receive a LA injection that used a computer controlled device (Wand®) or a conventional syringe in 2 sequential treatment visits to see if the responses were dissimilar for lower or higher dentally anxious children. Children were randomly assigned to a Wand® or conventional injection condition in this study, which was conducted in a secondary dental care practice specializing in treating children. The Dentist Subscale of the

Children's Fear Survey Schedule was completed by parents (CFSS-ds). The onset of five pain-related behaviors was recorded every 15 seconds on video footage of the injections, and a score just on Venham distress scale was assigned. After each injection, the kids were asked to rate their pain. Over the course of two treatment sessions, one group received 2 injections of local anaesthesia using a traditional syringe, while the other received two injections using the Wand®. The number of pain-related behaviors, distress scores, and self-reported pain rankings were all compared. Subjects were divided into two groups based on their CFSS-ds scores: those with a high level of dental anxiety and those with a low level of dental anxiety. A total of 147 people took part in the study, with 71 of them being girls between the ages of 4 and 11. There was no difference between an injection with a traditional syringe & an injection with the Wand® during the first or 2nd treatment session based on the actions showcased during LA injection & the reported pain after injection. In response to the local anaesthetic injection, however, anxious students indicated the most pain ($p = 0.001$), presented more pain-related behaviour ($p = 0.002$), and showed more distress (p 0.001) than moderate anxious children on first treatment session. They came to the conclusion that there was no substantial difference in the reaction of referred children when given an injection with Wand® versus a plastic syringe. The standard of dental anxiety in children was discovered to be a significant element in their response to a local anaesthetic injection.

Kosaraju A and Vandewalle [2009] [(19)]compared the efficacy of a refrigerant versus topical anaesthetic gel in decreasing pain throughout a posterior palatal anaesthetic injection. Adults who needed scaling & root planning by using LA anaesthesia or regular operative treatment were included in the study. They was using

the refrigerant 1,1,1,3,3-pentafluoropropane 0r 1,1,1,2-tetrafluoroethane to organize the tissue site before injection, followed by a two-minute application of a topical anaesthetic gel (% lidocaine cream gel) in palatal area, followed by a 30-gauge needle injection of a local anaesthetic solution. Participants used a 100-millimeter visual analogue scale (VAS) with endpoints of "no pain" and "worst possible pain" to rate the pain after each injection. They determined by calculating VAS rating by calculating the length in millimetres between the no-pain end and the pain end of a magnitude of scale. A paired-samples t test (=.05) was used to analyze the data. They discovered that the refrigerant group had an average VAS rating of 17.7 15.3 mm, while the topical anesthetic gel group had a VAS rating of 26.2 18.0 mm. When compared to topical anesthetic gel, the use of refrigerant significantly decreased pain during the deposition of local anesthetic injections (P =.02). In comparison to the use of a topical anesthetic gel as a pre-injection anesthetic, researchers found that using a coolant as a pre-injection anesthetic was more efficacious in reducing pain in participants receiving a palatal injection.

Sharkawi-El, Housseiny A and Mohmoud A [2012][(20)] investigated the effect of an audiovisual (A/V) distraction technique on pain sensitivity during the deposition of local anesthesia. A total of 48 healthy & cooperative 5- to 7-yr (23 men and 25 females) were chosen from the paediatric dentistry clinic at Alexandria University's Faculty of Dentistry in Alexandria, Egypt. The children were chosen because they had bilateral carious deciduous mandibular molars, which required an IAN block anesthesia prior to treatment. Two visits, one week apart, were scheduled for treatment. The A/V glasses were given to the children at random during a visit and no diversionary tactic during the other. A pain faces scale (PFS) and also the face,

legs, action, cry, & controllability scale (FLACC) were used as pain assessment scales. While using the FLACC scale, kappa statistics have been calculated to determine the observer's reliability. A Wilcoxon signed-rank order test was used to compare the two study techniques. The investigator used the coin toss method to assign children to obtain the distraction interference (A/V video glasses) place at a single visit and the tell-show-do technique without distraction at the other visit. Whenever the A/V glasses have been worn, the pain scores on both scales have been significantly lower. They indicated that distraction stimulated by audio-visual (A/V) goggles significantly decreases pain associated with injections depend on the findings of this study.

Deepika A, Rao CR, Vinay C, Uloopi KS, Rao VV [2012][21] evaluated by comparing the clinical efficacy of two strawberry-flavored topical anesthetics, Precaine® (8 percent Lidocaine + 0.8 percent Dibucaine) & Precaine® B (20 percent Benzocaine), in children prior to intraoral local anesthetic injections and then for extraction of primary teeth. The current triple-blind clinical 60 % of participants patients (Males-30, Females-30) in the age group of 6-12 years who were selected using a non-possibility proportional quota survey method at the OPD of Pediatric Dentistry. One of 3 methods was used with the kids: Technique 1: Palatal infusions are required for children, Technique 2: IAN block is required for children, and Technique 3: superior alveolar nerve block is required for children. Technique 3: Extraction of Grade III portable primary teeth in children. Patients were tested for two different strawberry-flavored topical anaesthetic agents, Product I (Precaine® - 8

percent Lidocaine + 0.8 percent Dibucaine) and Product II (Precaine® B - 20 percent Benzocaine), both of which use a split-mouth design in each of the techniques mentioned above. Both products were alternately used with a split-mouth design in two visits, and the child's pain response was assessed utilizing the VAS & SEM pain scales.

Kamath PS [2013][(22)]investigated the action of the active & original distraction methodology WITAUL (Writing In The Air Using Leg) just on pain behavior & disclosed by children receiving LA injections leading up to treatment. The study included one hundred sixty children between the ages of four and ten who required nerve blocks. By flipping a coin, the children have been randomly designated to either a study or a control group. Both groups of children were instructed to relax & breathe deeply to the count of ten. In the course of anesthetic treatment, the 80 children inside the intervention group have been instructed to raise their right leg & write their identity inside the air continuously & slowly (WITAUL). The 80 children in the control group were instructed to continue deep breathing. The Modified Toddler-Preschooler Post-operative pain Scale (TPPPS) was utilize to evaluate the children's behavior aged 4–5 years, and the FACES Pain Magnitude was utilize to assess the behavior of children aged 6 years and older . They discovered that using WITAUL as a distraction and thus trying to manage pain during local anesthesia administration was statistically meaningful (p-value 0.0001) when especially in comparison to the control method. The average Modified TPPPS rankings (4 – 5 yrs) for the WITAL group were 2.461.752 & 5.642.328 for the control group. The WITAUL group had a mean score of 31.748, while the control group had a score of 6.261.858.

Nieuwenhuizen J, Hembrecht EJ, Aartman IHA, Krikken J, Veerkamp JSJ [2013][(23)] evaluated if difference in the child's pain & distress response during utilization of two distinct computer-controlled local pain-relieving delivery methods, the Sleeper One & WAND. This study included 118 young kids (59 girls) years of age 4 to 6 (mean 66 months, 9 months). Children were assigned randomly either to the Sleeper One or the WAND as a sample population of subjects treated in 3 pediatric dental clinics by 4 dentists in total required at least one local analgesia. By using Sleeper One or the WAND, they discovered that children exhibited the same quantity of disruptive behavior during the injection phase (the Mann–Whitney U test, p[0.05]). Sleeper One's average injection time (average 2.49 minutes, SD 0.56) seemed to be significantly lower than the WAND's (average 3.20 minutes, SD 0.61; the Mann–Whitney U test, p 0.001). Based on the findings, they concluded that there was no significant difference in the child's pain and distress response between the WAND and the Sleeper One. The Sleeper One had a faster average delivery time.

Nuvvula S, Alahari S, Kamatham R and Challa RR [2015] [(24)] investigated the efficacy of three dimensional glasses in lowering anxiety in children receiving local anesthetic (LA)injection. This was a parallel-design randomized clinical trial on ninty kids of age 7 to 10 years to evaluate the comparative effectiveness of audio & AV distraction in reducing anxiety during dental treatment in children. Ninty children were randomized into three groups: control (basic methods without distraction), sound (basic techniques plus music), and AV (basic methods plus 3D AV). All children received LA with or without distraction, and their anxiety was estimated by utilizing a combination of measures, including MCDAS(f) (self-report), pulse rate, behavior (utilizing Wright's modification of Frankl's behavioral rating scale & Houpt scale),

and child inclination. They discovered that all children who finished the study had a statistically significant reduction in anxiety in the audiovisual group, as disclosed by MCDAS (f) scores (p0.001) & Houpt measure (p = 0.003); whilst the pulse rate increased statistically significantly (p0.001) in all three groups, regardless of distraction. The use of 3D video glasses was also confirmed by the child's preferences. As a result, they concluded that a subjects who had used three Dimensional video goggles during treatment reported high levels of satisfaction.

Bagherian A and Mohamood S [2016][(25)]compared children's pain perception to cotton-roll vibration anesthesia versus routine topical anesthesia. In this randomized controlled trial, 48 subjects were eluded to a private specialty pediatric dental clinic to evaluate their reactions to two methods of local anesthesia administration, cotton-roll vibration technique versus control method. They were given 2 separate IANB and otherwise maxillary molar infiltration injection, using both (a combo of topical anesthesia gel, & vibration for distraction, cotton roll) and control (routine topical anesthesia) methods. Children's behavioral pain reactions were assessed using the author-developed) scale, yielding total scores in between 0 to 18. They discovered that totalscores in cotton-roll vibration and control ranged between 0-5 and 0-10. A cotton-roll vibration method had a lower mean and standard deviation amount of total score on the scale (1.21 1.38) than the control method (2.44 2.18), which was significant statistical (P 0.001). The cotton-roll vibration technique appears to be more effective than conventional topical anaesthesia at reducing behavioral pain responses in children throughout local anaesthesia administration.

Abdelmoniem S and Mohmoud S [2016][(26)] The impact of various distraction techniques (active, passive, & passive-active) on children's pain perception throughout LA deposition was investigated. This study included ninety children aged four to nine years who needed the IANB to remove a mandibular primary molar and had shown "definitely positive" behaviour (Frankl 3 or 4), regardless of previous dental experiences. At random, the total sample was categorized into 3 groups. There are 30 students in each class: The children in the passive distraction group were instructed to listen to the same song while wearing headphones. The kids were commanded to alternately move their legs down & up as if they were playing games together as an active distraction team. The passive-active distraction group was a hybrid of an active and passive way to distract (kids were directed to listen to a melody on headphones and move their legs down and up alternatively). During the administration of local anesthesia, distraction methods were used. SEM scale and the Wong-Baker FACES Pain Scoring System were used to assess the perception of pain during local anesthesia administration. The researchers discovered that there was no statistical difference among 3 groups for both the SEM scale and the Wong-Baker Face images Pain Rating Scale, with P scan rates 0.743 and P = 0.112, respectively. In aspects of pain perception reducing during local anaesthesia administration, the diversionary tactics studied produced similar results. The WBFS scale and the SEM scale both exhibited a similar photo of children's pain perception.

Ramírez-Carrasco A, Butrón-Téllez Girón C, Sanchez-Armass O, Pierdant-Pérez [2017][(27)] investigated the efficacy of hypnosis in combination with behavior management techniques in pain reduction or anxiousness at the spot of administrating dental anesthesia in pediatric patients. Forty patients who met

inclusion criteria were randomized assigned to one of two groups: experimental or control (20 children in each). Both groups were given standard conventional behavior management techniques to help them stay calm, receptive, at ease, and unwinded. Before the kids were given a seat just on the dental unit, the detector and electrode functions, as well as the sensations those who could cause, were explained. Headphones were required for both groups. The experimental group was subjected to a quintessential directive hypnosis intervention, whereas the control group was instructed to use headphones to drown out the noise of the dental drill. Anxiety/pain was present. The FLACC scale was used to assess anxiety/pain during the anesthetic instant, and also heart rate & skin conductance were assessed prior to and during the anesthetic moments in the experimental and control group. They discovered a marginally statistically significant ($p = 0.05$) difference in heart rate between baseline and anaesthetic moment, with hypnosis gathering having a lower heart rate. The FLACC scale and skin conductance showed almost no substantial differences ($p > 0.05$). As a result, they claimed that hypnosis used in conjunction with traditional behavior management techniques lowers heart rate during anaesthetic infiltration, suggesting that hypnotic treatment may improve anxiety/pain influence.

Agahi et al [2017][(28)] studied the efficacy of telescopic tooth needles in limiting pain and anxiety during paediatric dental procedures and compared it to conventional dental needles. This study included 50 healthy kids aged 4 to 8 years who needed dental restorative work on their posterior upper jaw under local anaesthesia. Observer scored videos of children throughout injection processes using the (SEM) scale and distress reaction to evaluate the observed pain-related behaviour. The children then completed a face-to-face variant of the VAS after the injection

(VAS). The reliability of the observer's point of view was determined to be 96%. For statistical analysis, independent t-test, as well as chi-square tests, were used. P 0.0500 was used to define statistical significance. This study was carried out. The participants in this study were 50 subjects. They discovered that the pain scores for the telescopic & dental needles were 40.20 10.50 and 56.40 14.63, respectively, which was statistically significant (P = 0.0001). The difference in SEM values between both the telescopic & conventional groups was statistically meaningful (P = 0.0001) in both totals & individual parameters. According to mean distress scores, patients showed less muscular tension, less verbal protest, & much less movement when receiving a telescopic needle (P 0.0500). As a result, it was determined that telescopic tooth needles can use topical anaesthesia prior to needle placement, and that covering needle sight out of the patient's eyes might be a benefit.

Studies on Acupuncture for pain control

Lao L, Bergman S, Hamilton GR, Langenberg P and Berman B [1995][(29)]ascertained the duration and intensity of an analgesic action of acupuncture compared to a placebo after surgical removal of incomplete osseous impacted mandibular third molars. There were 19 patients who needed surgical 3rd molar extraction method. Immediately following surgical procedure, the patients were randomized assigned to one of two groups: acupuncture and otherwise placebo acupuncture. In each patient, the very next acupuncture points were used: Hegu (LI 4) is a fingertip positioned between base of ones thumb and index finger. Jiache (St 6) With teeth clenched, each finger spacing anterior & superior to angle of mandible so at belly of masseter muscle, Xiaguan (St 7) In depression between both zygomatic arch and condyloid process anterior to a ear. Yifeng (SJ 17) is located in a depression

between mandible and the mastoid process, posterior to the lobule of the ear. After cleaning the dermal site of alcohol, single use acupuncture needles were inserted to a depth of 0.3 to 0.8 inch (by pressing through a plastic needle tube). To create the placebo & acupuncture procedures comparable, the needle was placed ipsilateral to tooth extraction corner, & a part of adhesive tape was adhered next to the needle. All needles were manually twisted every 10 minutes: at the start, midpoint, and end of treatment. Needles were left in place for just a sum of 20 minutes before being removed. In contrast, an empty plastic needle tube had just been tapped on the osseous area next to each of acupoints to generate some discernible sensation in placebo acupuncture patients. The length of time it took to reach moderate pain and the intensity of pain after oral surgical intervention were recorded using standard patient self-report. Lao et al discovered that subjects who received acupuncture had longer pain-free period times (average, 181 vs 71 minutes; p 0.046) and less intensity of pain than others who obtained placebo acupuncture. They concluded that this report supports a feasible alternative for the testing of acupuncture, including a legitimate placebo control; it demonstrates that acupuncture was much more efficient in the magnitude of analgesia when compared to placebo and might even be used as an adjunctive treatment .

Wang S and Kain ZN [2001][(30)] investigated the effects of preoperative anxiety on ear acupuncture. The study included 91 outpatient outpatient surgical patients with ASA I & II physical status. Participants were assigned to one of 3 intervention groups. 1. Conventional Chinese Medicine group: the above group got ear acupuncture associated with the conventional Chinese hypothesis that kidney is associated with fear, heart with anxiousness, and or the shenmen point with

tranquillity. A kidney place is located somewhat on superior concha, a heart point is located in its most central part of inferior concha, & shenmen point is located just on lateral wall of triangular fossa. 2. Relaxation group got ear acupuncture utilizing the relaxation, tranquillizer, & master cerebellar points that have been shown to generate stress relief, general sedation, & anxiety reduction, respectively. The relaxation point is now on superior lateral aspect of triangular fossa, the tranquillizer point is on inferior tragus, and master cerebral point is on the ear lobe-face 3 joint. The control group was given ear acupuncture needles on 3 points which have no documented effect on anxiety. The Scheffe trial for multiple comparisons reported that patients inside the Relaxation team had all been significantly less anxious than control subjects. The anxiety levels of patient populations inside the group, on the other hand, did not significantly differ from that in Control or from others in the Relaxation team. They deduced that ear acupuncture reduces preoperative anxiety symptoms in patient underwent ambulatory procedures based on the evidence. Ear acupuncture is simple to use, inexpensive, and has few side effects.

Shen Y, Younger J, Goddard G and Mackey S [2002] [(31)] examined the effect of a standardized acupuncture protocol in patient populations of myofascial pain of jaw muscles. Eighteen participants (15 girls, 3 boys; age group 22 - 52 years) were enlisted with the primary claim of recurring distress (at least four times per week) with in jaw muscles for at least 12 weeks. A random chart was used to assign subjects to one of 2 categories: conventional acupuncture procedure (n = 10) and otherwise sham therapeutic interventions (n = 8). Acupuncture needles were implanted to just a depth of 10 to 30 micrometres at both the left & right Hoku pts & also left & right Stomach 6 points in the acupuncture group. The sham acupuncture

team had four needles implanted to a depth of 2 - 4 mm at four sham pts: left & right hand 1 cm distal of a Hoku point (not on acupuncture meridian), & also the stomach 6 point 1 cm dorsal. Prior to the actual & following experiment, a visual analogue scale (VAS) was being utilized to examine differences in masseter muscle aches provoke by direct stimulation of masseter muscle. They discovered that both groups experienced a statistically significant decrease in VAS pain scores (P =.001). Seven out of ten acupuncture subjects reported a 10 mm or greater VAS pain reduction; whereas only four out of eight sham acupuncture subjects reported such a reduction. There were no statistical significant significant differences between two groups. Authors concluded that both acupuncture & sham acupuncture decreased pain elicited by direct stimulation of masseter muscles in patients suffering from myofascial pain. However, if the needling was done in conventional acupoints or in some areas of the skin had no effect on the pain reduction. These findings suggest that pain reduction caused by a noxious stimulus (i.e., needling) may not be location specific, as anticipated by classical acupuncture literature.

Rosted P and Bundgaard M [2003][(32)] investigated if the onset duration can be reduced by administering acupuncture 2 minutes even before local anesthetic. This study was planned as a clinical study encompassing 30 healthy adults who required an anesthetic for therapies in the lower jaw. Patients were randomly assigned to one of three treatment groups using a random number table. Group I was indeed a segmental acupuncture group that used local acupoints SI-19, ST5 and ST6 inside the innervation of the third branch of the trigeminal nerve. Group II: hetero-segmental superficial acupuncture group that used distant points LI4 and TE3 in the C6-T1 segment. LI4 is indeed a point just on muscle among both your thumb and finger. The

TE-3 point is behind the knuckles within groove created by tendons of the fourth and fifth fingers. Group III: A control group only received the traditional treatment, inferior dental nerve block (ID block), with no acupuncture. They discovered that all of the patients who were tested reported adequate anaesthesia during drilling test. Anaesthesia was achieved with in segmental acupuncture group in 62 seconds, compared to 115 seconds with in hetero-segmental surface level acupuncture group and 119 seconds in the control group, which received only standard treatment. The distinction between segmental acupuncture group as well as the hetero-segmental superficial acupuncture team was statistically significant (p0.015); a difference between both segmental acupuncture team as well as the hetero-segmental superficial acupuncture team was not statistically significant (p0.015). The difference in treatment here between segmental acupuncture group compared to the control, which received only a local inferior dental block, was also significant (p0.032). There was no significant difference (p0.84) between both hetero-segmental superficial acupuncture group and control group that received only a regional inferior dental block. Based on the evidence, they concluded that giving segmentally administered acupuncture even before to the regional inferior dental block reduces the onset time of local anaesthesia. It must, however, be replicated, including objective measurements.

Wang S,Maranets I, Weinberg ME, Caldwell-Andrews AA and Kain ZN [2004] [(33)] investigated as to if parental auricular acupuncture decrease parental preoperative anxiety, allowing children to profit from parental existence during anaesthesia induction. This randomized, double-blind, sham-controlled trial included mothers and their children as participants. Mothers of children scheduled for surgery were randomly assigned to either an acupuncture intervention group (auricular press

needles at the relaxation, tranquillizer, and master cerebral points) or even a sham acupuncture control subjects (ear press needles at wrist, shoulder, and extraneous auricular point). The intervention was carried out at least 30 minutes before the child was sedated. During the anaesthetic induction, all mothers were present. During the perioperative period, mothers and children's behavioral and physiological anxiety were assessed. As a result, they discovered a group-by-time interaction in a multivariable analysis of motherly anxiety as function of group. That is, after initiation, maternal anxiety was significantly lower in the acupuncture group. A multivariate prototype also found that kids whose moms did receive acupuncture interference were substantially less anxious when entering this same operating room and when the anesthesia mask was introduced. Between the 2 groups, there was no substantially difference in blood pressure or heart rate. As a result, S Wang indicated that auricular acupuncture reduced maternal anxiety significantly during the preoperative period. Acupuncture-treated mothers' children

Smith P, Mosscrop D, Davies S, Sloan P and Al-Ani Z [2007] **(34)**determined the true potency of acupuncture, compared effect of true acupuncture as well as sham acupuncture in the treatment of temporomandibular myofascial pain. Twenty-seven patients with myofascial pain who had been suffering from it for at least six weeks had been taken into account for the trial. They were categorized into two treatment groups. The first group received genuine acupuncture treatment, while the second group obtained a sham acupuncture treatment. Both examiner, as well as the patient, was unaware of the group assignment. Prior to the first treatment session, the outcome variables were estimated at base-line, and this was repeated after the last treatment. Their findings show that total acupuncture had such a stronger influence on

diagnostic and therapeutic outcome measures of temporomandibular joint as compared to that using sham acupuncture. The vast majority of these achieved statistical significance. They came to the conclusion that acupuncture had such a positive effect just on symptoms and signs of TMJ MP. Furthermore, this study shows that Park Sham Device was a reliable acupuncture control method in experiments involving facial acupoints.

Karst M, Winterhalter M, Münte S, Francki B, Hondronikos A and Eckardt A [2007][(11)] compared an efficiency of auricular acupuncture for reducing dental anxiety to intra-nasal midazolam, placebo as acupuncture, and no treatment. Sixty-seven eligible patients who needed dental extractions were randomized to auricular acupuncture, (ii) placebo as acupuncture, & (iii) nasal spray midazolam, & compared to a control group that received no treatment. Group of auricular acupuncturists: Relaxation, tranquillizer, & master brain points within the ear on no dominant side were utilize to treat subjects in this group. These points have been shown to reduce preoperative anxiety. No. 3 Seirin B-type needles were being utilized. A Placebo ear acupuncture team: got placebo ear acupuncture using finger as well as liver points, which have not been shown to reduce anxiety placebo needle framework was utilize, wherein the tip of a needle was blunted to produce a pricking sensation similar to that of real acupuncture with out truly puncturing the skin. Group of midazolam: D rug was administrated via spray bottle as a conventional injectable solution, with 3 consecutive puffs through each nostril. The spray bottle produced a fine aerosol, and the average midazolam dosages per induction were 0.675 mg. As a result, each patients underwent a dose of midazolam averaging 4 mg. Anxiety was measured before, 30 minutes, after dental extraction. Physiological variables were

monitored in real time. They discovered that when compared with patients in placebo acupuncture group, patients in the auricular acupuncture group as well as midazolam group had been significantly less anxious at 30 minutes. Furthermore, auricular acupuncture or intranasal midazolam application significantly improved patient compliance as measured by the dentist. Based on the findings, they deduced that the auricular acupuncture as well as nasal spray midazolam was equally effective for treating dental anxiety.

Witt CM, Pach D, Brinkhaus B, Wruck K, Tag B, Mank S, et al [2009] [(35)] assessed the safety of acupuncture in a significant number of people receiving positive health care as well as, based on their findings, initiate a unique medical consent for acupuncture. Average age 51.0 ± 14.3 years, 64.8 percent female had been enrolled and received 10.17 3.0 acupuncture treatments on average for chronic knee or hip osteoarthritis pain, low back pain, neck pain or headache, rhinitis, breathing problems, or dysmenorrhoea. Following treatment, all patients reported adverse events related to acupuncture. Patients who revealed a need for treatment because of an adverse effect filled out the extra standardized questionnaire on most serious adverse effect. Based on this information and taking ethical and legal considerations into account, a new consent form has been developed. They discovered that 229,230 patients received 10.2 3.0 acupuncture treatments on average. Overall, 19,726 patients (8.6 percent) reported at least 1 adverse effect, with 4,963 (2.2 percent) reporting one which necessitated treatment. Bleedings or hematomas were the most common adverse effects (6.1 percent of patients, 58 percent of all adverse effects), followed by pain (1.7 percent) and vegetative symptoms (0.7 %). A pneumothorax occurred in two patients. The side effect that lasted the longest was 180 days. The resulting medical

consent form is divided into 5 modules: introduction to acupuncture & moxibustion. Acupuncture treatment risks, Conditions that may increase the risk, a doctor's statement, and consent are all required. They conclude that physician-administered acupuncture is a reasonably safe treatment, and the proposed consent could help all patients and professionals obtain informed consent.

Schliessbach J, van der Klift E, Arendt-Nielsen L, Curatolo M & Streitberger K. [2011] [(36)] evaluated the effectiveness of short hand operated & electrical acupuncture stimulation upon pressure pain detecting thresholds (PPDT) to non penetrating sham acupuncture (NPSA). This was a placebo-controlled double-blind study. A total of 45 healthy pain-free participants (over the age of 18) were recruited among hospital employees and students. Acupuncture & NPSA were both conducted using manual & electrical stimulation, resulting in a total of four treatments for each individual. Each intervention lasted 5 minutes, and they were all done in a single sitting with a 10-minute washout time in between. Acupuncture was administered at acupuncture points 4 and 11 on the big intestine (LI4 and LI11). LI4 (Hegu) is a finger that is located between both the thumb and index finger and also is widely utilised in pain treatment. LI11 (Quchi) is located on the cubital crease's lateral side. The Streitberger needle (asia-med) was used for NPSA, which has been examined in various investigations. The dull needle tip doesn't really enter the skin, but rather returns to its shaft. Hand operated stimulation was performed using rotating the needle at a 180* angle, both clockwise & anticlockwise, and raising & pushing it 2–3 mm across its vertical axis at the same time. This movement was repeated at interval of thirty secs for 5 mins of needle insertion, starting with LI4 and ending with LI11. The AS Super -4 HAN electro-acupuncture stimulator was used to conduct

electroacupuncture. Electroacupuncture increased PPDT more than any other technique during the study. Acupuncture techniques were much more effective right away. Acupuncture methods were relatively more effective than NPSA after however didn't vary. Manual acupuncture received 4.1, electroacupuncture received 2.7, manual NPSA received 2.5, and electro-NPSA received 1.2 (P 0.001 with the exception of electroacupuncture versus manually NPSA). Researchers concluded that electroacupuncture induced larger PPDT increase than manual acupuncture, and that acupuncture in general had a much stronger analgesic effect than NPSA. In the setting of only brief acupuncture, these benefits appear to be transient (5 minutes). Acupuncture's superiority to NPSA adds to the evidence supporting acupuncture's analgesic benefits.

Michalek-Sauberer A, Gusenleitner E, Gleiss A, Tepper G & Deusch E. [2012] [37]investigated if auricular acupuncture at outer ear, helped alleviate anxiety before to dental treatment. This trial was prospective, randomized, sham-controlled, and patient blinded. After providing written informed permission, 192 adult patients (aged 18 years) planned for elective dental operations were participated in this study. Patients were assigned to one of three groups using a computer-generated randomization table. 1) Auricular acupuncture group—Patients got auricular acupuncture at three places that have been shown to reduce anxiety: the relaxation point, the tranquilizer point, and the master cerebral point. 2) Sham group—ear acupuncture was applied to acupoints on the finger, shoulder, and tonsil. These locations, which are located in similar areas of the external ear, have no known effect on anxiety. The needles were inserted into the ear opposite of the dominant hand in the affected ear. 3. Non-intervention control —Patients received no anxiety-reduction

intervention. They discovered that auricular acupuncture lowered state anxiety score from 54.710.8 to 46.910.4 (mean SD) more effectively to sham acupuncture from 51.910.2 to 48.410.0. In the control group, state anxiety increased from 51.011.7 to 54.011.6 (mean rise +3.0; Confidence +4.7 to +1.2). When compared to a noncontrol group, the reduction in anxiety symptoms in the both intervention and control groups was significant statistically (p0.001). After controlling for differences in baseline anxiety, the anxiety decrease inside the auricular acupuncture group was 7.3 score points (CI 9.0 to 5.6) and 3.7 score points (CI 5.4 to 1.9) in the sham group (p00.008). As a result, they deduced auricular acupuncture, a non-invasive treatment, efficiently lowers state anxiety.

Grillo CM, Wada RS, & Da Luz Rosario de Sousa M [2014] [(38)] investigated the efficacy of acupuncture on acute dental pain in people waiting for care at the after emergency dental care clinics. The research was carried out at the Piracicaba Dental School's after-hours emergency dental treatment clinic.120 individuals with severe dental pain who'd been awaiting dental care and in between age from 18 to 90 yr was included. The pain severity was measured using the (VAS). All patients had one acupuncture session; the points LI4, ST44, and CV23 were chosen and administered alone or in combination. LI4 (Hegu): the 4th point of large intestine (LI) meridian positioned within the back of a hand; analgesic point for painful illnesses of face & teeth. It is crucial in terms of analgesia. The meridian is tightly connected with the mouth cavity in its internal course. ST44 (Nei Ting): a penultimate point of stomach meridian (ST) , found in the foot here between second and third metatarsals; suggested for toothache and edoema relief. The stomach meridian passes through the region around mouth, mandible, & maxillary gums.

CV23 (Lian Quan): the vessel's penultimate point. It is positioned inside midline of ventral depression just above hyoid bone, with patient seated with the neck in extension; used to treat face discomfort. They discovered that pain was reduced in 120 patients. They came to the conclusion that the results generated by acupuncture analgesia might be a technological addition to pain control among patients with dental pain, promoting health restoration with a social benefit.

Usichenko TI, Wolters P, Anders EF & Splieth C [2016][39]investigated the efficacy of L-I4 stimulation for pain alleviation in children receiving a local anaesthetic injection (LA). At LI4, seventy-four children who were due for dental treatment with LA underwent bilateral acupuncture with indwelling fixed needles. When the thumb & index fingers are pulled together, LI4 is placed on the highest point of the muscle. During the procedure, the patients' parents massaged the needles to excite them. A standardized LA injection administered 5 min after acupuncture was compared to a LA injection administered without acupuncture. The treatment order was randomized, with the two treatments conducted in a crossover fashion on different days. Pain severity following LA injection, as measured by the patient's use of the Verbal Rating system. Pain severity and agitation were rated by parents and dentists, as well as heart rate & the patients' satisfaction with the therapy. They discovered that when acupuncture was utilized, patients reported decreased pain: mean 2.3 vs 3.9; $P< 0.001$ when compared to therapy without acupuncture, the patients' heart rates stayed low during the dental procedure following LI4 stimulation (P 0.05). When compared to LA injection alone, L-I4 was harmless and boosted satisfaction in both patients and families (P 0.05). As a result, they came to the

conclusion that stimulating acupoint LI4 lowers pain & autonomic discomfort in children following LA injection during dental treatments.

Sharma S, Dhanraj M & Jain A[2018][(40)] explored Acupuncture as an effective method of administering an anesthetic to treat dentinal hypersensitivity. A total of 15 healthy human volunteers from both genders were chosen for the split-mouth design investigation, with a total of 20 bilateral, important posterior maxillary or mandibular teeth suggested for tooth preparation. The individuals were divided into 2 groups based on inclusion criteria such as age 25–65, men and females, appropriate mouth opening, bilateral mandibular or maxillary vital posterior molars suggested for preparation of teeth, & willingness to participate in the study. Using a coin flip, the subjects were separated into 2 equal groups. Using the subperiosteal infiltration method, lignocaine was placed across the apices of the abutment on the buccal side in Group A individuals. One side receiving subperiosteal injection was altered in Group B. Acupuncture, on the other hand, was administered by a skilled and registered acupuncturist in both groups. Following tooth preparation, participants used the Heft–Parker VAS score to interpret their sensations throughout the operation. No statistically significant difference between the two approaches was found. Based on the findings, researchers concluded that acupuncture anesthesia is equally effective as subperiosteal infiltration anesthesia in reducing hyperesthesia throughout tooth preparation. As a result, acupuncture anaesthesia can be used in clinical conditions when local anaesthetic drugs are contraindicated.

Studies on Acupressure for pain reduction in children

Alkaissi A , Evertsson K, Johnsson VA, Ofenbartl L & Kalman S [2002][(41)] evaluated the impact of sensory stimuli of P6 point on post-operative nausea and vomiting following gynaecological surgery in a clinical environment. A prospective, consecutive, multicenter, placebo-controlled, double-blind clinical experiment with a reference group comprised 410 women appointment for elective gynaecological surgery. Subjects were categorized into three groups at random. One group (n = 135) received bilateral P6 acupressure. The Pericardium and Ni Guan (P6 or PC6) tendons are positioned three fingerbreadths underneath the wrist inside forearm, between two tendons. A second group (n = 139) applied identical pressure to bilateral non-acupressure locations, while a third group (n = 136) functioned as a control group. Nausea, vomit, pain, and treatment satisfaction were all noted. The primary outcome was full response, which included no nausea, vomiting, or need for rescue treatment during 24 hours. The results were examined using logistic regression using therapy indicators, kind of operation, and PONV risk score as explanatory factors. They discovered that the full response was more often in the P6 acupressure group than the control group. In contrast, overall incidence for PONV was 46% in the control group, 38 percent following pressure on a non-acupoint, & 33% following P6 acupressure. They came to the conclusion that, P-6 acupressure is indeed a non-invasive technique that might be used as preventive antiemetic treatment during gynaecological surgery.

Kober A, Scheck T, Schubert B, Strasser H, Gustorff B & Bertalannffy P et al. [2003][(42)] tested auricular acupressure to see if it may alleviate stress & anxiety

throughout ambulance travel. The research comprised 36 patients who'd been transported via ambulance with accompanied paramedics to local hospitals for expected unpleasant gastrointestinal operations. They were categorized into either a relaxing point (n = 17) or a sham point (n = 19) for auricular acupressure. Bilateral auricular acupressure was applied to subjects in this group at a "relaxation" location on upper lateral wall of triangular fossa. This set of subjects got bilateral auricular acupressure at one "sham" point, which is described as an acupuncture point that has not been shown to have any relaxing or anxiolytic effect? A sham acupuncture point employed in this investigation is near the concha's tip. Acupressure was administered using a microplastic ball (1-mm diameter) pushed on the aforementioned spots and secured with an opaque ear patch that stayed in place until the conclusion of transportation. To quantify state anxiety as well as the patient expectation of hospital medical treatment, a visual analog scale was utilized (estimated waiting period for treatment, anticipated pain throughout treatment, attitude toward doctors, & treatment outcomes). These characteristics were evaluated both at the outset and upon admission to the hospital. On arrival at the hospital, patients within the relaxation group reported significantly less anxiety compared to patients in the sham group similarly, in the relaxation group, patients' perceptions of pain during therapy and treatment results for their diseases were much more favorable than in the sham group. There were no differences detected in the other factors studied. As a result, they found, auricular- acupressure is indeed an effective anxiety therapy in perioperative emergency settings.

Agarwal A, Ranjan R, Dhiraaj S, Lakra A, Kumar M & Singh Uet al. [2005] [(43)] investigated the efficacy of using acupressure at an additional 1 point in

individuals having elective surgical operations. Seventy-six people with ASA grades I and II who were undergoing elective surgery were randomly allocated to one of 2 equal groups. Group 1 (control) got acupressure at an inconvenient location (acupressure was given 2 centimeters lateral & horizontal from the lateral end of the left eyebrow) & Group 2 (acupressure) got acupressure at an additional 1 point. Extra 1 site is situated just at root of the nose between the two brows. Patients were permitted to relax for 15 minutes after arriving inside the pre-operative area on the morning of the procedure. Following that, acupressure was applied based on the group allocation. The same investigator administered acupressure to a pulp of right thumb in a rotational motion at 20–25 cycles from 1min to 10 mins. Patients were examined for additional 30 mins after the acupressure was removed. Thus, the total research time was 40 mins (acupressure administration for 10 mins + 30 mins following pressure release). Anxiety was measured using a visual stress scale at start of the trial and then every 10 and 40 min thereafter. At 0, 2, 5, 10, 12, 15, 30, and 40 min, the bi-spectral index was measured. They discovered that the VSS reduced in both groups after 10 mins of pressure application: the median visual stress scale in the acupressure group was 5 (1) vs. 8 (1) and 7 (0) vs. 8 (1) in the control group. Overall pre-operative anxiety & BIS decreased considerably with an additional 1 point b acupressure application. Based on the findings, researchers concluded, acupressure is helpful in reducing overall preoperative anxiety & BIS; unfortunately, these benefits do not last 30 minutes after the acupressure is released. More research is needed to determine how long acupressure is beneficial.

Fassoulaki A, Kostopanagiotou G, Tsakalozou E & Markantonis S et al. [2007][(44)]studied whether these declines are linked to variations in melatonin and -

endorphin levels. The research included four men & eight women with ASA I, aged 28 to 35 years. In a randomized fashion, each participant got three treatments. Each therapy was given one day after the previous one. Acupressure was delivered to the additional 1 acupoint as part of Treatment A. Pressure was administered on the sham point placed 2 cm from lateral end of the forehead in Treatment B. Treatment C, comprised no application of pressure. Each patient was wired into a BIS monitor. Three 1-minute interval measurements were taken to acquire baseline values, which were then averaged. They recorded a median of 3 successive BIS readings for each measurement. They discovered that acupressure just on an extra 1 point lowered the BIS & verbal stress score values but not melatonin or -Endorphins. They came to the conclusion that acupressure just on an extra 1 point seemed to have no influence on melatonin or -endorphin levels. However, because it proved effective in relieving tension, the approach can be employed as a sort of pre-medication for ambulatory patients.

Wang S, Escalera S, Lin EC, Maranets I & Kain ZN[2008][(45)]investigated whether acupressure just at Extra-1 acupoint may reduce preprocedural anxiety and provide hypnotic effects. This randomized, controlled experiment included children aged 8 to 17, classed as ASA Physical Status (I-II), who have been appointment to receive GA for gastrointestinal endoscopic operations. Fifty-two youngsters were randomized allocated to either Extra-1 acupuncture point/ sham point for acupressure bead treatments. Ex-1 Group- Intervention at the Extra-1 acupoint, located in the middle of the brows. Intervention was performed just above the lateral border of the left brow in the sham group. In this study, acupressure therapies were provided using an acupressure-bead affixed to just a self-adhesive tape that held the bead in place. All

children were fitted with a Bi-spectral Indexmonitor prior to the start of the intervention. Anxiety was measured at both the baseline & before entering the surgery room. Anesthetic procedures were standardized & kept consistent with IV propofol infusions titrated to maintain BIS values of 40–60. They discovered that following the intervention, children inside the Extra-one group had less anxiety, but children in the sham group had more anxiety (9 percent [3 to 15] vs 2 percent [6 to 7.4], P = 0.012). In contrary, no significant differences in BIS values were identified across groups throughout the preprocedural waiting time (P = ns). They discovered that overall intraprocedural propofol needs were not different between the two research groups (214 76 g kg1 min1 vs 229 95 g kg1 min1, P = 0.52).. As a result, they came to the conclusion, acupressure beads intervention at Extra-1 acupoint lowers pre-procedural apprehension in children having endoscopic operations. However, this intervention has no effect on BIS levels or intraprocedural propofol needs.

Matsubara T,Arai Y-CP, Shiro Y, Shimo K, Nishihara M & Sato J et al [2010][(46)]studied, the impacts of acupressure over local (LP) & distal (DP) acupuncture points in females of chronic neck pain. 33 female subjects with chronic neck pain took part. The participants were divided into three groups at random. The LP group got acupressure over local acupuncture points i.e GB 21 (located in the muscle first by pinching a shoulder muscle with thumb & middle finger), SI 14 (just on the back, 3 cm lateral to the inferior portion of the transverse processes of T1), and SI 15 (on the back, 3 mm obliquely to the inferior portion of the transverse processes of T1) (2 cm oblique to the spinous process C7), DP group received acupressure at distal acupuncture points LI 4 (situated on the highest spot of the muscle when the thumb & index fingers are brought close together), LI 10 (located on the outer

exterior of the forearm and three fingers breadth underneath the elbow crease when the elbow is bent 90 degrees), and LI 11 (located on the outer surface of the forearm & 3 fingers breadth below the elbow crease when the elbow is able to bend 90 degrees) (located at the lateral end of the cubital crease & at the midpoint that connects the radial end & the external humeral epicondyle). Acupressure satisfaction was measured using the verbal rating system (VRS), the Pain And Disability Index (NDI), the State-Trait Anxiety Stock (STAI), muscle toughness (MH), secretion alpha-amylase (sAA) action, heartbeat (HR), rate variability (HRV), and vital sign variability (HRV) values. As a result, they discovered that after acupressure, the VRS, NDI, STAI, and MH values in the LP and DP groups reduced. Only the LP group's HR decreased as well as the strength of the continuous wave (HF) element of HRV continued to increase after acupressure. As a result, they concluded that acupressure significantly improved pain conditions in females with chronic neck pain both local and distal acupuncture points, but only affected the ANS on local acupoints, as acupuncture points per different physical effects.

Santoro A, Nori SL, Lorusso L,Secondulfo C, Monda M & Viggiano A [2015][(47)] looked into whether auriculotherapy (AT) can affect pain threshold. Sixteen healthy volunteers, in between age from 20 - 24, were assumed from among the young people who attended the. They were split into 2 groups. AT entailed putting Vaccaria seeds over one ear's "fingers point." The study enrolled 2 groups of healthy volunteers. On three occasions, each participant was asked to complete an autoalgometric resource for measuring by our group: before, 60 minutes after, & 24 hours after AT. Participants in the first group were given a 2-minute AT session, while those in the second group were given a 2-minute sham treatment comprised of a

puncture/massage just above the skin of the neck. The autoalgometric test was based of the subjects themselves applying increasing pressure to a round-shaped needle with the tips and backs of four fingers (i.e., eight sites have been evaluated) for 2 times: till a minimum unpleasant sensations (1st time, minimal test) or even a maximally manageable pain sensation (second and third time, maximal test) (2nd time, maximal test). As a result, when compared to sham treatment, there was a significantly higher pain limit in the maximal test 24 hours after AT. They discovered that AT can start increasing pain tolerability rather than impacting the negligible pain threshold based on the findings.

Lin W, Yeh CH, Chien L-C, Morone NE, Glick RM & Albers KM [2015][48] investigated The physiological methods of auricular moment in time acupressure (APA) analgesics. 4-week APA intervention was utilised to control low back pain in this pilot randomized clinical trial (RCT), which included 61 participants. Participants were randomly allocated to one of two groups: real APA (n=32) or sham APA (n=29). 27 percent of the 61 participants have been receiving those certain treatments were not, and 11 percent (n=6) had never received any treatment. At base-line & after a week of treatment, blood samples, pain intensity, as well as physical function were collected. Subject matters in the real APA reported significantly a 56 percent reduction in pain intensity and just a 26 percent improvement in physiological function as a result of the intervention. A decrease in IL-, IL-, IL-, & calcitonin gene-related peptide [CGRP] was observed in serum blood samples, while an increase in IL- was observed. The sham APA group, on the other hand, reported a 1% reduction in pain and a 1% improvement in physical function, with minimal changes in inflammatory cytokines & neuropeptides. Between real & sham APA groups,

statistically meaningful differences in IL- & CGRP expression were found. As evidenced by APA-induced modifications in plasma levels inflammatory cytokine & neuropeptide levels, these results indicate that APA treatment affects pain intensity by modulating the immune system.

Sivinagini Y and Jain A[2018][(49)]investigated the effects of acupuncture & acupressure on gag reflex prevention during prosthodontic treatment. A study was performed on 48 middle-aged patient populations (with an average age of 45 years) who attended the OPD belong to Saveetha Dental College & Hospitals, Saveetha University, in Chennai, Tamil Nadu, in the south of India. To regulate gagging during dental treatment, the patients agreed to try acupuncture and acupressure. The intensity of gagging has been evaluated prior to treatment. Patients with Grade IV (serious gagging) & Grade V (very serious gagging) on the gagging severity index were chosen.CHEN-JIANG (Point A)-on the area of the face, inside the depressive episodes in the center of a mentolabial groove named as NEIGUAN (Point B)-on the inner forearm, three finger breadths just below the wrist, between the two tendons, and HEGUS (Point C)-between the base of thumb & finger. The dental procedure then was completed, and the treatment's effectiveness was evaluated. The data were analyzed using one-way variance analysis (ANOVA) & a paired test. The one-way ANOVA suggested no significant differences between the groups. The mean time duration was 136.50 30.68, with a mean onset of 66.58 12.31, according to descriptive analysis.There is a significant value between all six groups when compared to the paired t-test: Acupressure (Chenjiang n10.05, Neiguan n2 0.05, and Negus n3); acupressure (Chen-jiang n4 0.05, Neiguan n5 0.05, and Hegus n6- 0.05); the acupressure (Chen-jiang n4 0.05, Neiguan n5 0.05, and Hegus n6 0.05). They came to

the conclusion that using acupuncture and acupressure to prevent gag reflexes was effective. If clinicians are trained in this technique, it is a simple, quick, and easier way to control the gag reflex.

Avisa P, Kamatham R, Vanjari K & Nuvula S [2018][(50)] determined the impact of acupressure on lowering anxiety in children undergoing scaling & restorative procedures. The study included 225 children aged eight to twelve who were undergoing scaling /or restorative procedures and were assigned randomly to one of three groups: acupressure (Group 1), sham (Group 2), or control (Group 3). Acupressure on 2 anxiolytic points, the extra-1 point (Ying Tang) as well as auricular Shen Men point, in Group 1; acupressure on 2 points not recorded to reduce anxiety, the lateral boundary of a left eyebrow & the tip of a concha (point zero), in Group 2; and no acupressure in Group 3. The MCDAS was used to measure anxiety in all of the children. For groups, one and two, acupressure beads with just a piece of the adhesive strip have been used over the selected acupoints. MCDAS was also used to track anxiety levels in all of the children before and after treatment. The Frankl scale has been used to evaluate objectively to measure all of the children's behavior. In addition, a physiological parameter (pulse rate) has been recorded. The results from all 3 groups have been tabulated, compared, and statistically analyzed. As a result, there was a significant difference in MCDAS, pulse rate, & Frankl behavior ratings between the 3 groups of children, with the acupressure group showing less anxiety. As a result, they came to the conclusion that acupressure could be a viable option for reducing dental stress in children enduring scaling and root canal therapy.

Kumar DS, Bhattad DD, Sajjanar DA , Wasnik DM, Rojekar DN, Shukla DN et al [2021] [(51)]studied the impact of acupressure on dental anxiety & pain in children. Children aged 8 to 12 years old who needed an IANB for dental treatment were randomized to one of 3 groups: control, yin Tang acupressure, or Shen men. The Venham Picture method was used to test anxiety in all of the children, and the Wong-Baker FACES pain was utilize to assess pain perception. The objective measure was the Frankel scale, and the physiologic parameter was the pulse rate. The data were recorded, compared, and statistically analyzed. As measured by the Wong-Baker FACES pain scale, the acupressure substantially decreased pain perception (P 0.001). Between the groups, there was a substantially difference in dental anxiety.

MATERIAL AND METHOD

The present double-blinded randomized clinical trial was carried out in the Dept. of Pediatric & Preventive dentistry of the concerned dental college to determine the effectiveness of acupressure on pain during inferior alveolar nerve block injection in children aged 5-10 years old. The study was carried out after obtaining ethical clearance from the institutional ethics committee (IEC).

Parents of the children selected for the study have been explained the purpose and methodology of the study in local vernacular language and a signed informed consent with the Childs assent was obtained.

Sample size was determined considering mean difference in anxiety score in restorative procedure as the main outcome measure. Following assumption were made from the study by Avisa P et al in 2018 **(50)**.

μ_1 & μ_2 are standard normal values corresponding to specific α&β errors , s1 and s2 SD of 1st and 2nd group respectively, Z_α and Z_β are values of standardized normal variant for specified α and β respectively.

1. Mean ± anxiety score in group 1 = 4.4 ± 1

2. Mean ± anxiety score in group 2 = 3.3 ± 2

3. Mean difference (effect size) = 1.1

4. α-error = 5%

   Power (1- β) = 80%

So, the required sample size (n) was 32 per group. Therefore, considering possible dropouts of 10 %, a total of 37 children (74 primary molars) were included in this study and equally allocated.

SAMPLING METHOD:

Convenience sampling

A total of 74 children under the age group 5 to 10 years visiting the Dept. of Paediatric & Preventive Dentistry for routine dental care were screened and selected for the study as per the following selection criteria.

INCLUSION CRITERIA:

1. Healthy children in age group 5-10-year.

2. Children indicated for at least one clinical session of extraction requiring inferior alveolar nerve block.

3. Children who exhibited Frankl's behavior rating grade three or four i.e positive and definitely positive.[52]

4. Children whose parents/caretakers have given consent of participation.

5. Children who gave assent for treatment

EXCLUSION CRITERIA:

1. Active infection at the site of injection

2. Children allergic to local anesthetic agent.

3. Children with prior experience of local anesthetic injection.

STUDY DESIGN: A randomized, double-blind clinical study.

(Subject and first investigator (I1) performing IANB injection and extraction procedure were blinded to the allocation intervention group)

TREATMENT ALLOCATION:

The children were categorized into two groups based on simple randomization by envelope method. Total of 74 sealed envelopes were prepared, containing one card having the name of either of acupressure and non-acupressure intervention, accordingly 37 envelopes of group one and 37 of group 2 were prepared. The children were asked to pick one of these chits. This determined the group (acupressure or non-acupressure) under which treatment was carried out.

CLINICAL METHODOLOGY

During the initial screening visit, the child had undergone non-invasive treatment like fluoride application/oral prophylaxis to acclimatize to the dental environment and to evaluate their behavior. Also, the Wong-Baker scale was introduced to children to familiarize them with it. Allocation concealment was done on 1st visit.

Group 1 - Acupressure group.

Group 2 - Non-acupressure group.

On the second visit, the child had undergone the needed dental treatment (extraction) as per standard protocol [(53)] under IANB with the allocated group either acupressure or non-acupressure.

Those randomized to a study group (acupressure intervention group) were allowed to sit and relax in a quiet environment 15 min prior to treatment. Before 10 mins acupressure was applied at the extra -1 point (located midway between the medial ends of the two eyebrows at the root of the nose) by acupressure beads which were placed by a second investigator (I2), trained at a local acupressure clinic, and applied acupressure beads for all the children randomized to the study groups. Acupressure beads were manufactured with self-adhesive occlusive tape covering which creates standardized pressure; no further pressure or manipulation was applied after the bead was secured.

Then the patient was brought to the working area; allowed them to sit and relax for a while. Before giving LA, allergy testing was done. All IANB injections

were administered by the same operator i.e by principal investigator (I1). The injection site was dried with gauze. Topical anesthetic solution was applied at the injection site for one minute before IANB administration. IANB was performed using the conventional technique as described in Handbook of Local Anesthesia [(53)]. Local anesthesia(1:200000 adrenaline) used along with a 27 gauge needle syringe for insertion. Injection time was approximately 1.5 mL/minute3 with an average duration of nearly 2 minutes. Following this the surgical site was checked for the subjective symptoms and objective signs of anesthesia [(53)]. For those randomized to control group, the procedure was same but instead of acupressure bead self-adhesive tape, only self-adhesive tape was applied.

The video was recorded on the second visit from the time the child sat on the dental chair until the subjective symptoms and objective signs of LA started to appear. The video recorder was used at a fixed distance from the dental chair to ensure complete visibility of the child. Pain on injection was assessed both subjectively and objectively.

At the end of the second visit, parents were informed about the possibility of postoperative complications and were instructed to report any that were observed.

TOOLS OF MEASUREMENT:

Tools used for measuring pain on injection were as follows:

1. Wong-Baker Faces Pain Rating Scale: [57,58]

The Wong-Baker Faces pain rating scale consists of six faces with varying degrees of pain from left to right, each with a numerical scale ranging from 0 to 10.

2. Sound, Eye & Motor (SEM) scale: [54]

This scale is designed to measure subject comfort or pain. The comfort rating considers three types of observations: sounds, eyes, and motor. Each observation's level of response is assigned a numerical value, and these values are averaged to determine the comfort level.

Observation	Comfort or pain level			
	Score 1 (comfort)	Score 2 (mild discomfort)	Score 3 (moderately painful)	Score 4 (painful)
Sound	No sounds indicating pain	Nonspecific sounds; possible pain indication	Specific verbal complaints, e.g., "OW" raises voice	Verbal complaints indicates intense pain, e.g., scream, sobbing
Eyes	No eye signs of discomfort	Eye wide, show of concern, no tears	Watery eyes, eyes flinching	Crying, tears running down face
Motor	Hands relaxed; no apparent body tenseness	Hands show some distress or tension; grasps chair due to discomfort, muscular tension	Random movement of arms or body without aggressive intention of physical contact grimace, twitch	Movement of hands to make aggressive physical contact e.g., punching, pulling head away

3. Pulse oximeter

For measuring physiological parameters like pulse rate (PR) & oxygen saturation (SpO2) at baseline, during and after deposition of injection

METHODS OF MEASUREMENT:

A. ASSESSMENT OF PAIN ON INJECTION:

Subjective assessment of pain on injection: Pain on injection during the administration of LA solutions was recorded by asking the children to self-assess the pain experienced by Wong-Baker FACES Pain Rating Scale (FPS) just after the IANB administration [(55)].

Objective assessment of pain on injection: A second investigator (I2) assessed pain on injection during IANB administration in the child by replaying video recordings of each visit and rating them using the Sound, Eye, and Motor (SEM) scale [(47)].The level of response for each observation was given a numerical value and these values were averaged to assess pain on injection in children objectively.

Physiological measurement:- A pulse oximeter was used to measure pulse rate (PR) and oxygen saturation (SpO2). TSD was used to introduce the pulse oximeter to the child. And SpO2 were measured in the waiting room at baseline and during injection deposition. During the procedure, the PR and SpO2 were recorded every 10 min. The values were noted down and the average of the value measured was calculated and noted down as the final value of PR and SpO2 during the deposition of injection.

Recording of data:

Respective parameter data (Subjective and objective measurement) was recorded in the customized case record proforma.

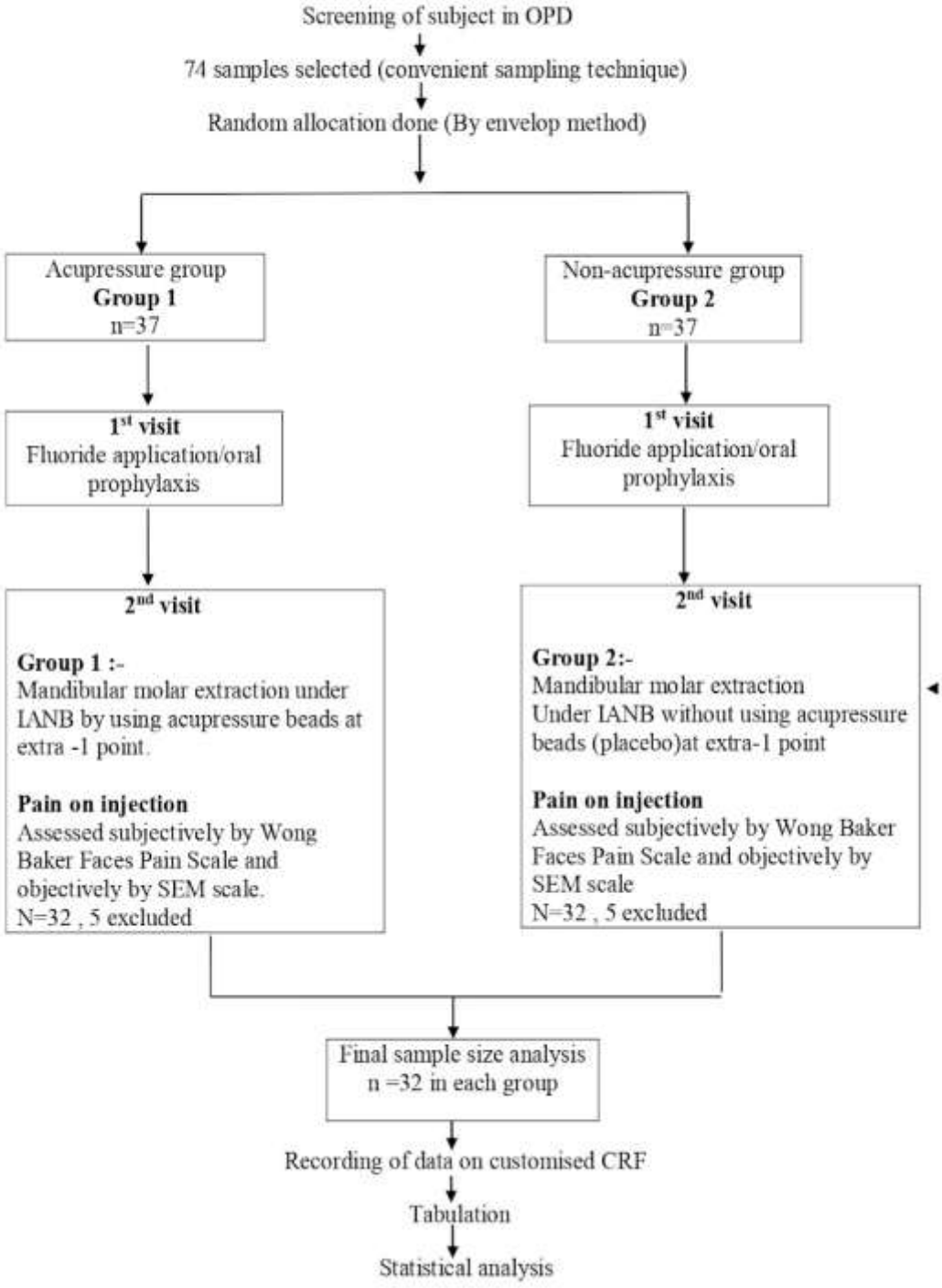
Training and calibration of a investigator (I3):

Prior to the start of the study, a researcher was calibrated for the sound, eye, and motor (SEM) scale. During administration of IANB, ten patients who were not included in the study were video graphed. The SEM motor responses on these recorded videos were rated by one investigator and one independent expert. Following that, the values for both observers were calibrated until complete agreement was achieved.

Intra rater reliability:

The first 10 patients with mandibular injections procedures were videotaped and the same videos were reassessed by the same rater (I2) at 1 month's time for intra examiner reliability [(56)].

Procedures and protocol



Materials –

1. Surgical gown, Facemasks, Head cap and Disposable gloves **(colour plate no.1, fig. 1)**

2. Oral examination diagnostic instruments – **a**. mouth mirror **b**. probe **c**.explorer **d**.tweezer. **(colour plate no.1, fig. 2)**

3. Other Materials –

    a. Upper and lower foam trays and acidurated phosphate fluoride gel (Fluorolgel. Azure laboratories Pvt ltd.) **(colour plate no.2, fig.3)**

    b. Topical anesthetic solution **(colour plate no.2, fig.4)**

    c. Disposable syringe with 24-gauge needle (Dispo Van) **(colour plate no.3, fig.5)**

    d. 2% lignocaine HCl (with adrenaline1: 200000). **(colour plate no.3, fig.6)**

    e. Acupressure beads **(colour plate no.3, fig 7)**

4. For measuring pain on injection –

    - Sound, Eye, Motor (SEM) scale
    - Wong-Baker faces pain rating scale.
    - Pulse oximeter

COLOUR PLATE NO. 1

Fig.1: Surgical gown, Facemasks, head cap and surgical gloves

Fig.2 :- Diagnostic instruments

COLOUR PLATE NO. 2

Fig 3. Upper and lower foam trays and APF topical fluoride gel

Fig 4: Topical anesthetic gel

COLOUR PLATE NO. 3

Fig 5: Disposable syringe with 24 gauge needle

Fig 6: 2% Lignocaine with 1:200000 adrenaline

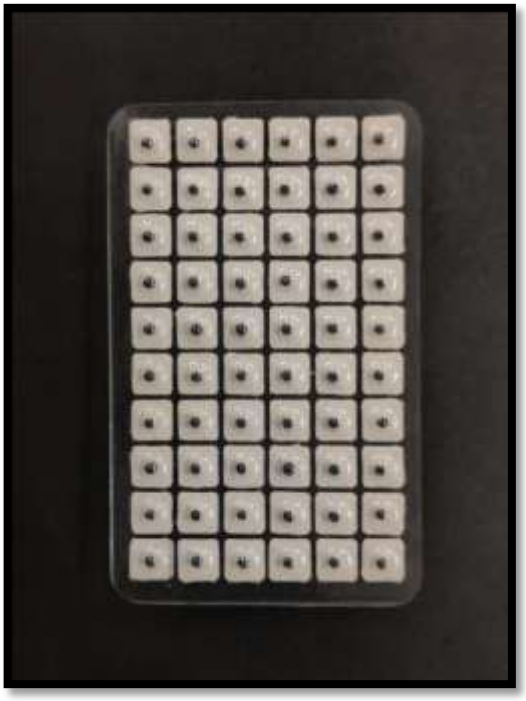


Fig 7 : Acupressure bead

COLOUR PLATE NO. 4

Fig. 8 - Application of acupressure bead in waiting area by investigator 2

Fig.9

Fig.10

Fig. 11

Fig 9,10 & 11- Intra-operative photograph

RESULTS

This was a randomized, double-blind clinical trial. Based on inclusion criteria, 74 patients between the ages of 5 and 10 years were chosen and randomly divided into two groups of 37 each. Among which 5 patients from each group were excluded from the study since they became uncooperative during the procedure. Hence, the final sample size analyzed were 64 patients (n=32 in each group). All 64 patients received IANB block, however, group 1 received IANB along with acupressure beads and group 2 without acupressure beads.

The parameters were measured at various points throughout the procedure. When the child sat in the dental chair, baseline scores were taken. The parameters were measured before and after the injection of local anaesthetic. All parameters were recorded, and statistical analysis was performed as needed.

Statistical methods:-

Frequency analysis (number and percentage) was done using Chi-Square for the categorical data and descriptive statistics for continuous data was performed. (Mean and standard deviation was obtained for continuous variables.) An unpaired t-test was applied to compare the continuous variable like in distribution of age, weight, Frankl rating score, Wong baker score and SEM score in between 2 Groups. Analysis of Variance (ANOVA) was used to compare continuous variables at different time intervals e.g in comparison of mean SpO2 and pulse rate at three different time intervals in group 1 and group 2.

The data was entered into IBM SPSS Version 21 for statistical analysis. All the data was assessed by keeping the confidence interval at 95%. ($P< 0.05$) obtained in the results were considered to be statistically significant.

Results

Inter-group comparison:-

1. Distribution of patients according to their age, weight and gender.

The descriptive statistics for demographic characteristics of age in between Group 1 and Group 2 (**Table 1, Graph 4**), the mean was 8.63 ± 1.27 and 8.36 ± 1.56 respectively. By using Chi-square test, statistically no significant difference was found in ages of patients of two group ($p>0.05$).

When distribution of patient was done according to weight of the children in Group 1 and 2 (**Table 1, Graph 5**), the mean was 25.92 ± 6.04, 27.50 ± 5.49 respectively. This difference was not statistically significant ($p>0.05$).

When distribution of patient was done according to gender between group 1 and 2 (**Table 2 Graph 1,2**) it was found that in group 1 - 12 male and 20 female and in group 2 - 17 male and 15 female were included. No statistical significance was found ($p = 0.78$)

2. Distribution of patients according to frankl rating scale

Out of 64 patients, 15 patients in group 1 and 17 patient in group 2 exhibited frankl score 3. 14 patients in group 1 and 18 patients in group 2 exhibited frankl score 4 (**Table 3, Graph 3**).By using chi-square test statistically no significant difference was found in frankl score in patients of two groups.(mean = 8.63 ± 1.27, $p>0.05$).

3. Distribution of patients according to pain on injection by assessing various parameters:

a. Wong baker Scale score (subjective parameter)

On comparing Wong Baker Scale Score for the pain on injection during administration of LA in both groups (**Table 4, Graph 6**), mean Wong Baker Scale score in group 1 was 2.00 ± 1.83 and group 2 it was 5.12 ± 2.63. By using student's unpaired t test, a statistically significant difference was found in Wong Baker Scale scores of two groups ($t=-5.506, p<0.05$)

b. Sound Eye Motor (SEM) Scale score (objective parameter)

On comparing mean Sound Eye Motor (SEM) Scale score for pain on injection between two groups, mean SEM score in group 1 was 1.62 ± 0.65 and in group 2 it was 2.84 ± 0.76 (**Table 5, Graph 7**). A statistically significant difference was found in Sound Eye Motor Scale scores of two groups ($t= -6.816$, $p<0.05$) by using student's unpaired t test.

c. Oxygen saturation (physiologic parameter)

When comparison of SpO2 at before, during, and after local anesthetic injection was done between the group 1 and 2 (**Table 8, Graph 8**) the mean before treatment was 97.62 ± 1.53, 96.75 ± 2.03 and this difference in mean was not statistically significant ($p>0.05$), During LA injection the mean was 97.06 ± 1.93, 92.09 ± 3.43 and this difference in mean was statistically significant ($p<0.05$) and after LA injection the mean was 97.37 ± 1.60, 93.71 ± 2.88 respectively and this difference in mean was statistically significant ($p<0.05$).

d. Pulse rate (physiologic parameter)

When comparison of pulse rate at before, during and after local anaesthetic injection between group 1 and 2 was done (**Table 11, Graph 9**) the mean before treatment was 90.37 ± 11.06, 91.59 ± 12.70 and this difference was not statistically significant ($p>0.05$). During LA injection the mean was 94.87 ± 11.22, 111.93 ± 17.76 and this difference in mean was statistically significant ($p<0.05$) and after LA injection the mean was 92.15 ± 11.33, 103.06 ± 14.16 respectively and this difference was statistically significant ($p<0.05$).

Intra-group comparison:-

a. Comparison of mean SpO2 at three time intervals within group 1.

When a comparison between Mean SpO2 was done before, during and after local anesthetic injection in Group 1(**Table 6**) the mean was 97.62 ± 1.53, 97.06 ± 1.93, 97.37 ± 1.60 respectively which was not statistically significant ($t=0.87$, $p= 0.41$).

b. Comparison of mean SpO2 at three time intervals within group 2.

When a comparison between Mean SpO2 was done before, during, and after local anesthetic injection in Group 2 (**Table 7**) The mean was 97.75 ± 2.03, 92.09 ± 3.43, 93.71 ± 2.88 respectively. This difference was statistically significant (t= 22.06, $p<0.05$).

c. Comparison of mean pulse rate at three time intervals within group 1.

When comparison of Mean pulse rate was done before during and after treatment in group 1 (**Table 9**) the mean was 90.37 ± 11.06, 94.87 ± 11.22 and 92.15 ± 11.33 respectively. The difference was not statistically significant (t=1.30, p= 0.27).

d. Comparison of mean pulse rate at three time intervals within group 2.

When comparison of mean pulse rate was done before during and after treatment in group 2 (**Table 10**) the mean was 91.59 ± 12.70, 111.93 ± 17.76 and 103.06 ± 14.16 respectively. Statistically significant difference was found (t= 14.7, $p<0.05$).

Intra rater reliability

There was good to excellent reliability between the examiners and the ICC ranged from 0.80 to 0.918 (as depict in **table 12**)

DISCUSSION

Pain is an unavoidable factor during various dental procedures because of which a patient, especially a pediatric patient may fear dental treatments. Pain management is critical in paediatric dentistry because it dictates the behaviour of the children during the current appointment and ensures their compliance for subsequent visits. One of the medical marvels of the 20th century was the introduction of local anaesthesia (LA) as a method of pain control in dentistry. The use of LA is required in order to reduce pain during various dental treatments. However, the very means used to alleviate pain may be a source of both pain & anxiety in children. Anxiety can lead to an increase in pain perception in children, making it difficult for them to receive optimal & necessary dental care thus, several procedural, behavioral, and pharmacological strategies have been proposed to alleviate pain and discomfort during pediatric dental treatment [(57)].

Acupressure is the non-invasive variant of acupuncture reported for reducing anxiety and thus pain. The working mechanism of acupressure is not well defined, although many theories have been established for acupuncture [(58)]. Acupuncture has been postulated to produce low-frequency electrical stimulation of the skin sensory receptors that cause the release of endorphins from the hypothalamus [(59)]. This theory has been substantiated by a study, which reported increased levels of β endorphin concentration in human cerebrospinal fluid after acupuncture stimulation [(60)]. This theory was in contrast with the study done by **Fassoulaki et al [2007]** which states that acupressure on the extra 1 point has no effect on melatonin and β-endorphin levels[(44)].

Other hypothesized mechanisms include simulation causing the release of neuropeptide-induced anti-inflammatory cytokines; altering brain neurotransmitters, such as serotonin, that play a key role in determining emotional states[(61)].

It can be hypothesized that the same mechanisms are applicable for acupressure, as it is a non-invasive variant of acupuncture. Acupressure is a non-invasive stimulation technique applied to acupoints. This can be administered either by direct finger pressure or using a bead/pellet over the targeted points. In the present study, acupressure beads (natural vaccaria seeds with a piece of adhesive tape, commercially available as AHCS Vaccaria Seed, Hyderabad, Telangana 500027) were employed over the selected points for constant pressure application. This method has an advantage over the direct finger pressure in children, as it is not technique sensitive.

In the current study, we aimed to evaluate the effect of acupressure on pain of the injection during inferior alveolar nerve block (IANB) in children aged 5-10 years. Acupressure does not require extensive training, in contrast to acupuncture where the background of the practitioner can influence the outcome of the treatment; acupressure can also be taught easily to the child/parent if used as a measure of self-care[(62)]. The same conclusion was made in the study done by **Vishwanath D.**[(63)]and **W Lin et al [2015]** [(48)].

The treatment procedures in the present study were initiated 40 minutes after the application of acupressure. This was in accordance with other studies done on acupuncture in adults, which documented a therapeutic effect as early as 30 mins after the application of acupressure beads [(50)].

In the present study, one of the anxiolytic points was selected, i.e extra one point (the Ying Tang) located midway between the medial ends of the two eyebrows at the root of the nose. The extra one point was selected, due to its reported ability to reduce anxiety which is in accordance with study done by **Viswanath D et al** [(63)]**and Armfield JM et al** [(64)]**.**

All the children selected in our study were cooperative (positive or definitely positive) according to Frankl's Behavior rating scale as the uncooperative children can give inaccurate pain assessments. Children of the age group 5–10 years were included in this study since this age group has been proposed as an age where cognitive development begins to manifest itself. 24 In addition, all patients were randomly categorized in 2 groups by simple unrestricted randomization (envelop method) [(65)].

In the current study, treatment was carried out in 2 visits. In the first visit, children in both groups underwent non-invasive treatment as required like fluoride application, oral prophylaxis to get them acclimatized to the dental environment and also confirm their co-operative behavior. During the second visit, the child had undergone the needed dental treatment (mandibular molar extraction) as per standard protocol [(53)]under IANB with the allocated group either acupressure or non-acupressure.

The IANB was chosen in our study to compare the pain of injection between two groups A and group B, as **Kaufman et al** has found that IABN is the most painful and results in more discomfort than infiltration, intra-ligamentary injection, and mental nerve block. Therefore, a reduction in injection pain for IANB was still needed [(66)]. In the current study, all LA administrations in children were carried out by the same operator to eliminate inter-examiner variability while pain perception was assessed by investigator 2 in order to provide accurate comparison between the two groups.

Since, pain is extremely difficult to quantify in children, in the present study pain on injection was assessed during administration of inferior alveolar nerve block using two different scales (subjective and objective). The Wong-Baker Faces pain scale was used as a self-report pain measurement (subjective measurement) by the children. For pain evaluation the self-report of a child for pain assessment is generally considered a "gold standard". The Wong Baker Faces Scale (WBFS) was chosen because it has good construct validity, adequate psychometric properties, and it is easy and quick to use, and inexpensive to reproduce [(67)].A systematic review by

Tomlinson D et al identified (WBFS) as one of the scales that is has undergone extensive psychometric testing and been used in the assessment of both acute and disease-related pain in children [(68)] .

In the present study, Sound Eye Motor (SEM) scale was used as an objective scale that measures the pain or discomfort taking into account the SEM components of the child's response to stimulation. Moreover, this scale has 90% inter-rater reliability [(52)]. An investigator 2 assessed the pain on injection by playing back the video record of the treatment. The level of response for each sound, eye, and motor observation was given a numerical value and these values were averaged to determine the clinical ratings for pain. To measure the consistency of investigator 2 at measuring the SEM scores for pain on injection, intra-rater reliability was established which was found to be good (p-value=0.001) (as depicted in Table 12).

On comparing Wong-Baker Scale Score (Table 4 & Graph 6) and SEM score (Table 5 & Graph 7) for the pain on injection during the administration of LA in both groups, the mean for pain on injection in patients of group 1 (acupressure group) was less than in group 2 (non-acupressure group) showing a statistically significant difference in pain on injection between two groups, both subjectively using WBFPS (t = -5.506,p=0.001) and objectively using SEM scale (t= -6.816, p=0.0001). These results are in accordance with **Kumar S et al [2021]** where they found a statistically significant difference for the pain on injection between acupressure and non-acupressure groups during the administration of IANB with less pain on injection in the acupressure group [(51)].

The objective assessments also include the measurement of physiological function. An increase in the activity of the sympathetic branch of the autonomic nervous system(ANS) is linked to the psycho-physiological responses induced by anxiety. Increased blood pressure & pulse rate are caused by changes in the cardiovascular system. A study carried out by **Rayen et al. [2006]** [(69)] concluded that pulse rate and blood pressure increase at same time as a result of stress and anxiety in the dental clinic. One of the most acceptable methods for measuring physiologic changes is using a pulse oximeter, which provides continuous percentage measurements of the patient's arterial haemoglobin and oxygenation as well as the pulse rate. As a result, it was utilized in this research [(70)].

In the present study, no difference was observed in between pulse rate and SpO2 at baseline in both the groups, which could be due to comparable state of vitals before the treatment. However, a significant difference was found during and after local anesthetic injection, which can be ascribed to the various mechanisms reported for acupuncture; however, in group 2 (non-acupressure), the pulse rate increased during injection and remained raised than baseline, during and after local anesthetic injection. Similar results were found in a study done by **Avisa et al [2012]** [(50)].

Limitation:-

1. A single session of acupressure could not precisely justify the effect of acupressure.
2. The split-mouth study design could have been provided homogeneity between the study groups regarding individual variables like age, gender, behavior etc.

SUMMARY AND CONCLUSION

The present randomized clinical trial was undertaken to evaluate the effect of acupressure on pain of the injection during inferior alveolar nerve block in children aged 5-10 years. Wong-Baker faces pain scale and SEM scale was used for subjective and objective pain assessment respectively. Physiologic parameters like pulse rate (PR) and oxygen saturation (SpO2) were also measured during and after local anesthetic injection.

The following findings were observed:-

1. In the Intergroup comparison, there was **no statistically significantdifference** observed according to age, weight, gender and Frankl rating scale with respect to pain on injection.
2. The subjective assessment of pain experience during local anesthetic injection was done by using Wong-baker pain score and found **statistically significant**

difference between acupressure(group 1) and non-acupressure group(group 2). The mean Wong-baker score was more in non-acupressure group as compared to acupressure.

3. The objective assessment of pain on injection was done by using SEM scale, and a **statistically significant difference** was observed between acupressure and non-acupressure group. The mean SEM scores were less in acupressure group than in non-acupressure group.
4. The physiologic assessment of pain on injection was done by using SpO2 and pulse rate and a **non-statistically significant difference** found between acupressure and non-acupressure group at baseline (before LA injection), which suggests that the groups were comparable at baseline. However, there was **statistically significant difference** between groups during and after LA injection.
5. There was a **statistically significant reduction** in pain on injection in acupressure group and **statistically significant increase** in non-acupressure group with respect to SpO2 and pulse rate during and after LA injection.

Based on this study's results, the following conclusions can be made:

According to the results shown by pain scales and physiologic findings, it can be stated that the use of acupressure at extra-one point reduced pain experience during inferior alveolar nerve block injection compared to non-acupressure in 5-10 years old and it can be used as adjunct to the conventional measures like topical anesthesia to reduces pain on injection during inferior alveolar nerve block.

Future Direction

To explore the effectiveness of single verses multiple sessions of acupressure in reducing pain experience during various dental procedures like restorations, root canal treatments, minor surgical procedures, etc.

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TABLES AND GRAPHS

Table 1. Distribution of patients according to age and weight in between group 1 and group 2.

	Group	Mean	Std. Deviation	T value	P value
Age	G1	8.6384	1.27707	0.776	0.441
	G2	8.3616	1.56370		
Weight	G1	25.9297	6.04908	-1.087	0.281
	G2	27.5000	5.49487		

Table 2. Distribution of patients according to gender in-between group 1 and group 2.

	Group	Male	Female	P-value
Gender	G1	12	20	0.078
	G2	17	15	

Table 3. Distribution of patients according to Frankl rating score in between group 1 and group 2.

	Group	3	4	Mean	Std. Deviation	T value	P value
Frankl rating score	G1	15	14	8.6384	1.27707	0.776	0.441
	G2	17	18				

Table 4. Distribution of patients according to Wong-Baker Scale score in between group 1 and group 2.

	Group	Mean	Std. Deviation	T value	P-value
(Subjective) Wong-Baker Scale	G1	2.0000	1.83162	-5.506	.000**
	G2	5.1250	2.63659		

Table 5. Distribution of patients according to SEM Scale score in between the group 1 and group 2.

	Group	Mean	Std. Deviation	T value	P value
SEM Scale	G1	1.6250	.65991	-6.816	.000**
	G2	2.8438	.76662		

Table 6. Comparison of Mean SPO2 at three intervals in group 1

SpO2	N	Min.	Max.	Mean	Std. Deviation	F	P value
Before treatment	32	92.00	99.00	97.62	1.53979	0.879	.419
During LA injection	32	91.00	99.00	97.06	1.93337		
After LA injection	32	92.00	99.00	97.37	1.60141		

Table 7. Comparison of Mean SPO2 at three intervals in group 2

SpO2	N	Min.	Max.	Mean	Std. Deviation	F	P value
Before treatment	32	91.00	99.00	96.7500	2.03200	22.067	.000
During LA injection	32	84.00	99.00	92.0938	3.43942		
After LA injection	32	87.00	99.00	93.7188	2.88751		

Table 8. Comparison of SPO2 at three intervals between groups 1 and group 2

SpO2	Group	Mean	Std. Deviation	T value	P value
Before treatment	G1	97.6250	1.53979	1.941	0.057
	G2	96.7500	2.03200		
During LA injection	G1	97.0625	1.93337	7.124	.000**
	G2	92.0938	3.43942		
After LA injection	G1	97.3750	1.60141	6.264	.000**
	G2	93.7188	2.88751		

Table 9. Comparison of Mean Pulse rate at three intervals in group 1

Pulse rate	N	Min.	Maxi.	Mean	Std. Deviation	F	P value
Before treatment	32	61.00	103.00	90.37	11.06214	1.309	0.275
During LA injection	32	67.00	109.00	94.87	11.22138		
After LA injection	32	62.00	108.00	92.15	11.33111		

Table 10. Comparison of Mean Pulse rate at three intervals in group 2

Pulse rate	N	Min.	Max.	Mean	Std. Deviation	F	P value
Before treatment	32	63.00	123.00	91.5938	12.70473	14.737	.000
During LA injection	32	71.00	146.00	111.9375	17.76902		
After LA injection	32	70.00	129.00	103.0625	14.16023		

Table 11. Comparison of pulse rate at three intervals in between the groups 1 and group 2

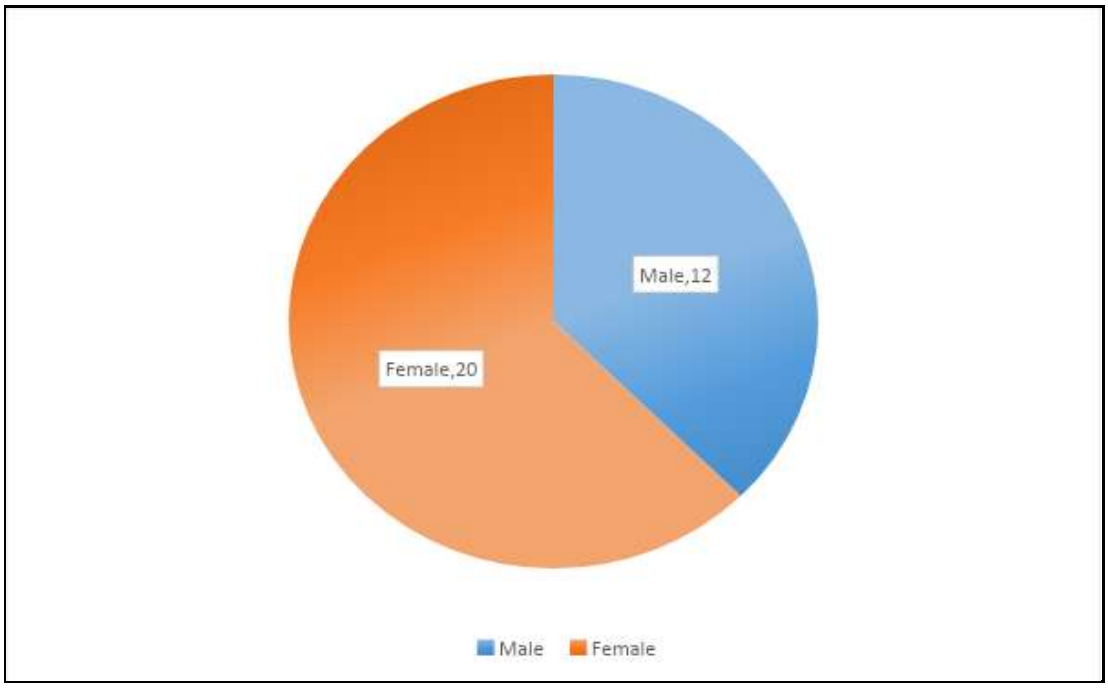
Pulse rate	Group	Mean	Std. Deviation	T value	P value
Before treatment	G1	90.3750	11.06214	-0.409	0.684
	G2	91.5938	12.70473		
During LA injection	G1	94.8750	11.22138	-4.593	0.000**
	G2	111.9375	17.76902		
After LA injection	G1	92.1563	11.33111	-3.402	0.001**
	G2	103.0625	14.16023		

12. Intra examiner variability in measuring different parameters

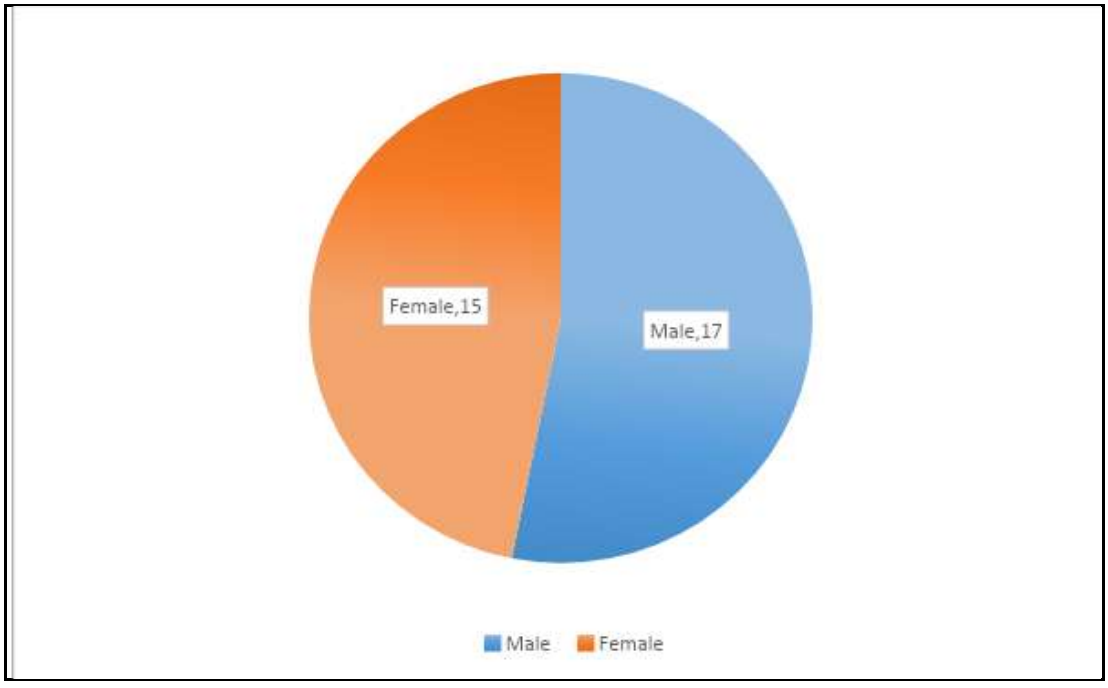
Parameters	Interclass Correlation Coefficient (ICC)	P-value
Wong-Baker Scale	0.892	0.02
SEM Scale	0.902	0.00
SPO2 Before LA injection	0.916	0.00
SPO2 During LA injection	0.918	0.00
SPO2 After LA injection	0.894	0.013
Pulse rate Before LA injection	0.899	0.011
Pulse rate During LA injection	0.802	0.034
Pulse rate After LA injection	0.800	0.041

GRAPHS

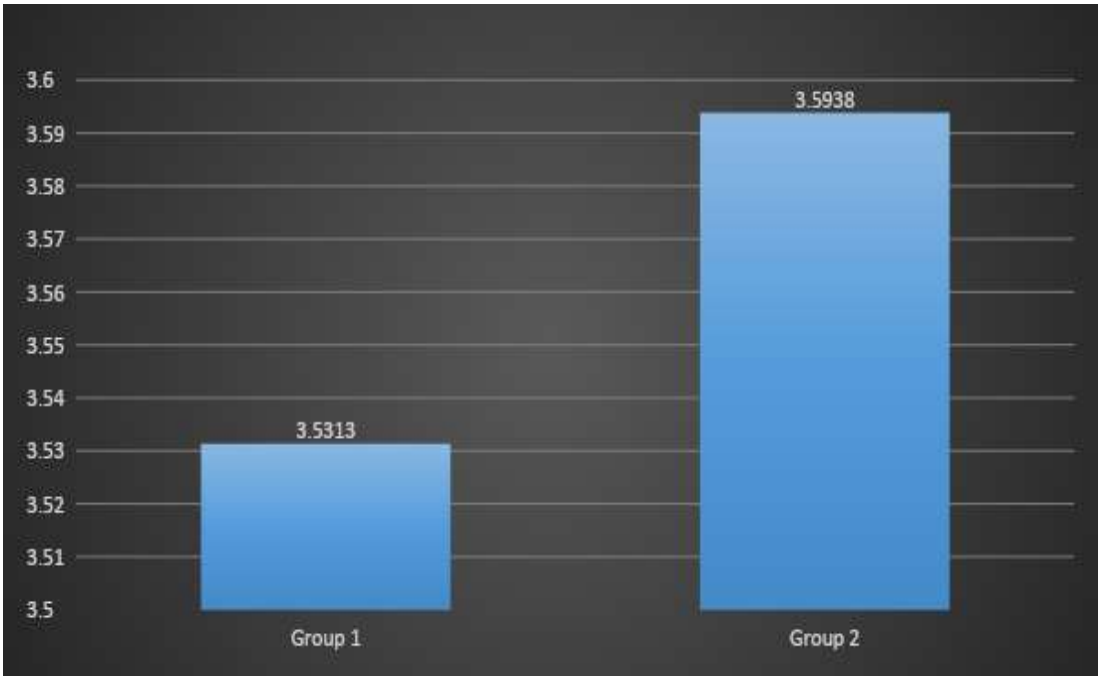
Graph 1. Gender distribution of study participants in group 1



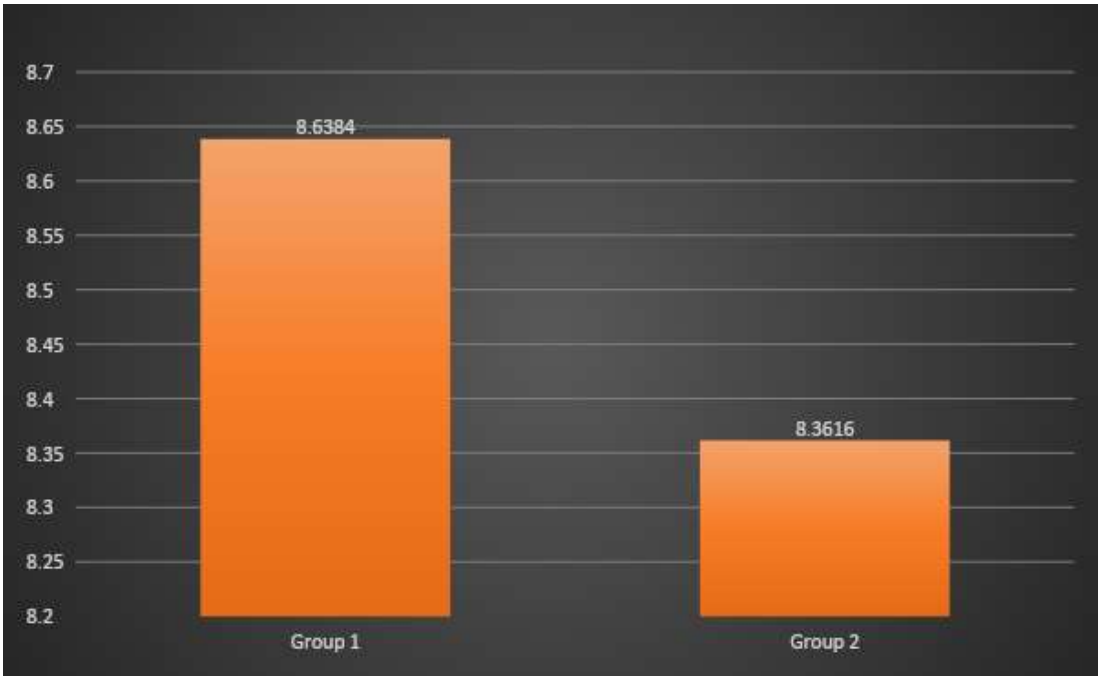
Graph 2. Gender distribution of study participants in group 2



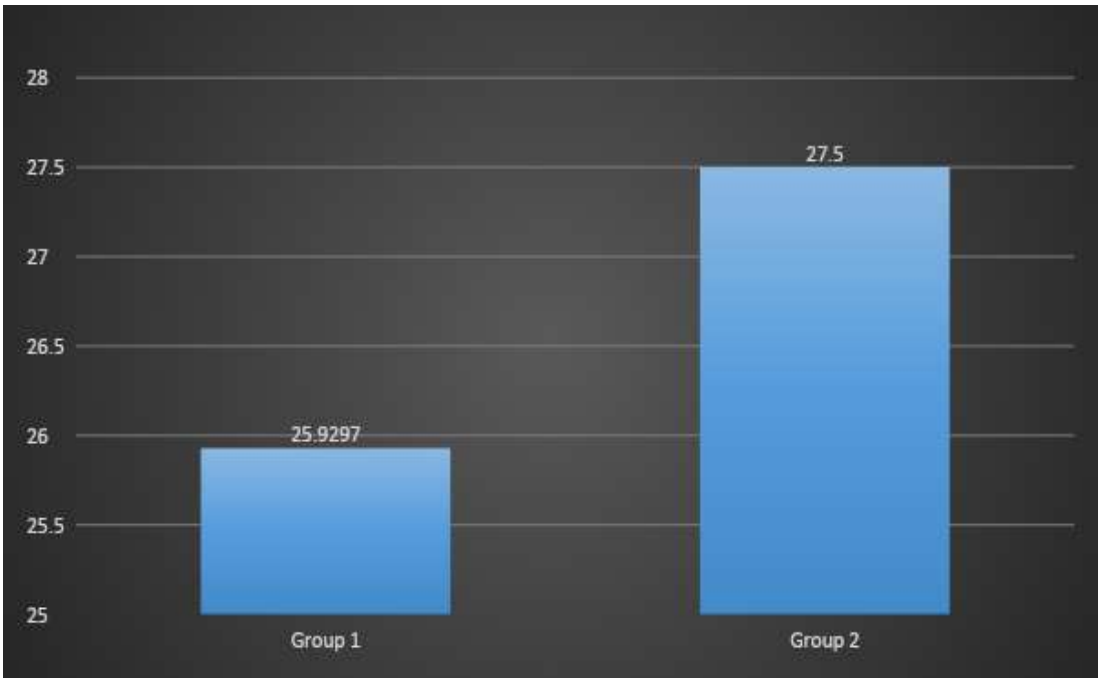
Graph 3. Comparison of Frankl rating score between group 1 and 2



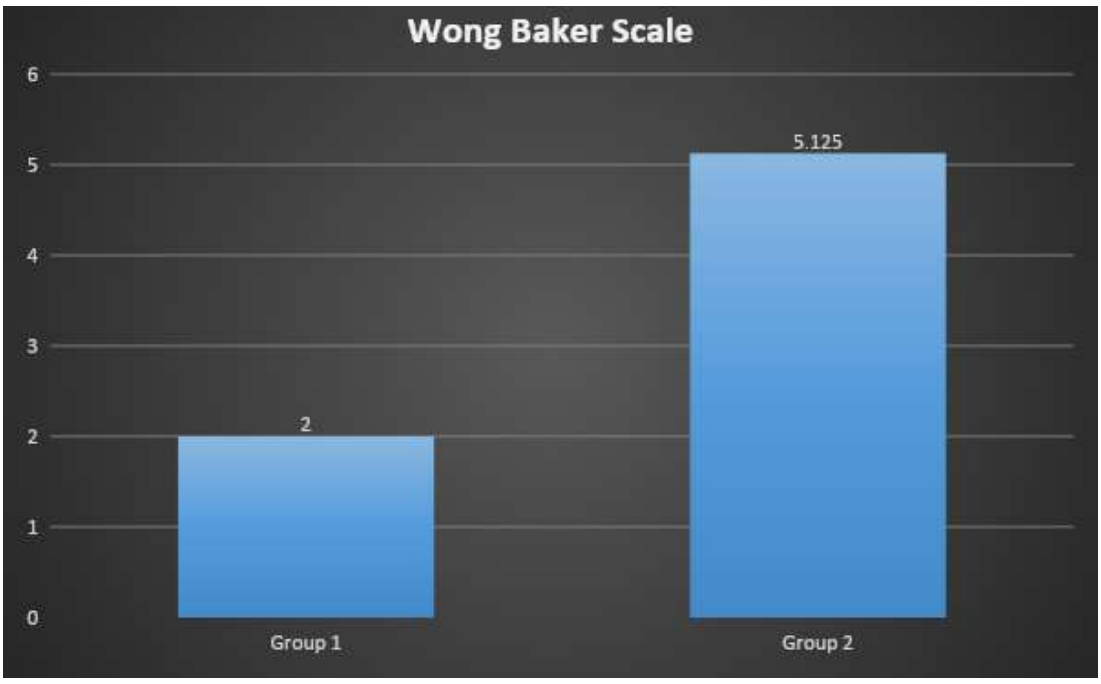
Graph 4. Comparison of age between group 1 and group 2



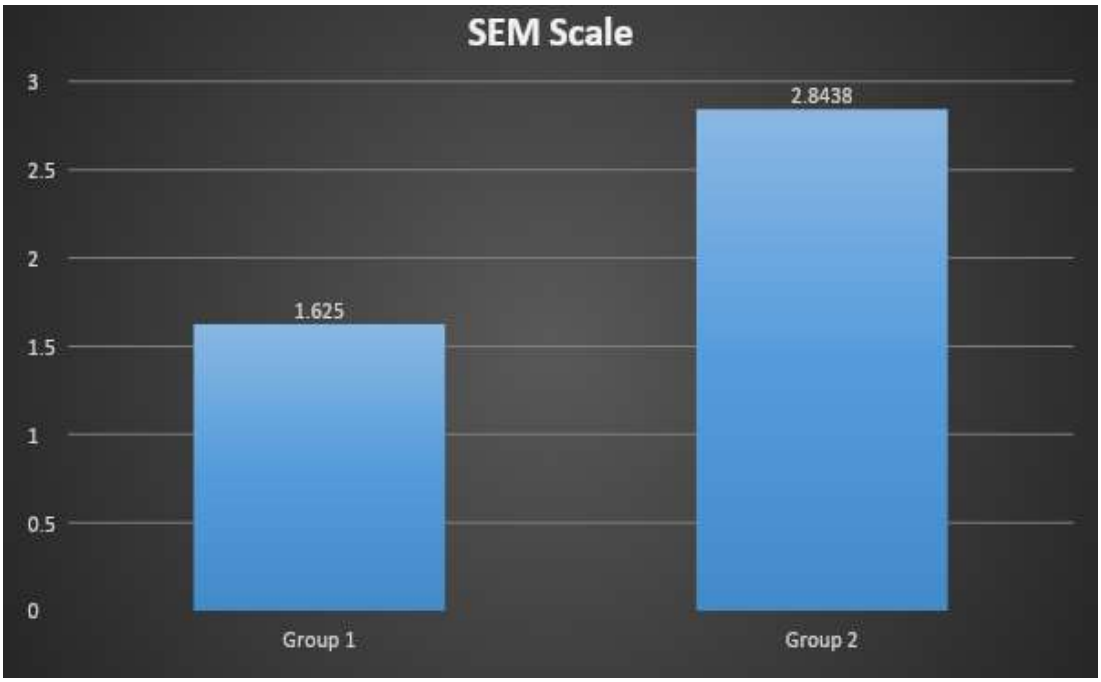
Graph 5. Comparison of weight between group 1 and 2



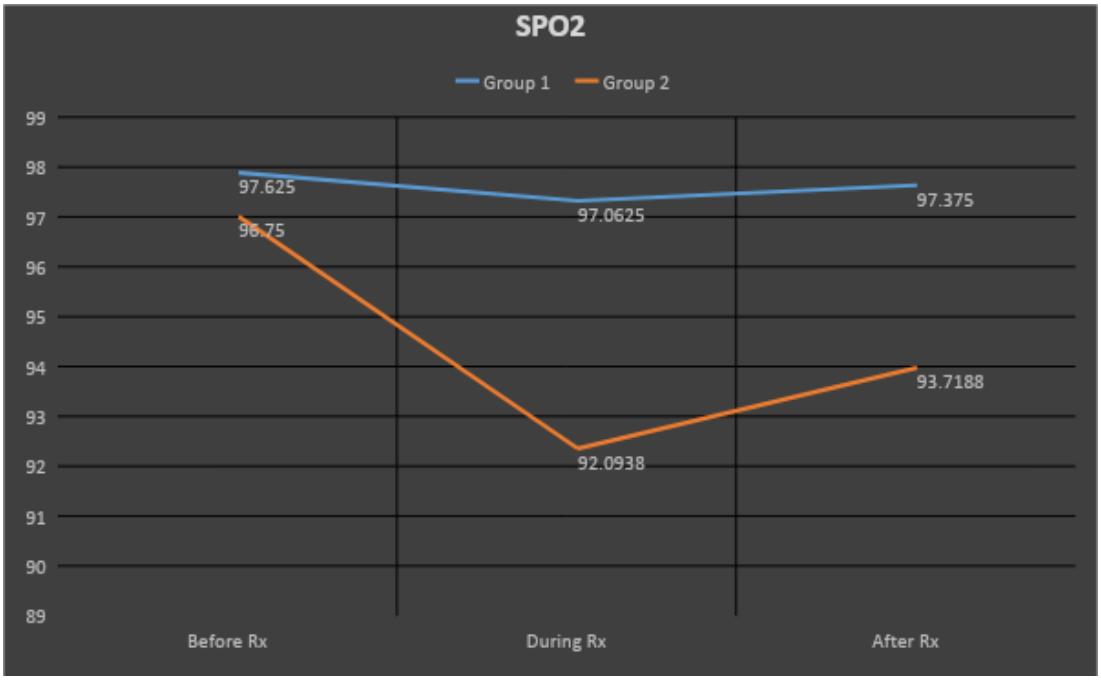
Graph 6. Comparison of Wong Baker Scale between group 1 and 2



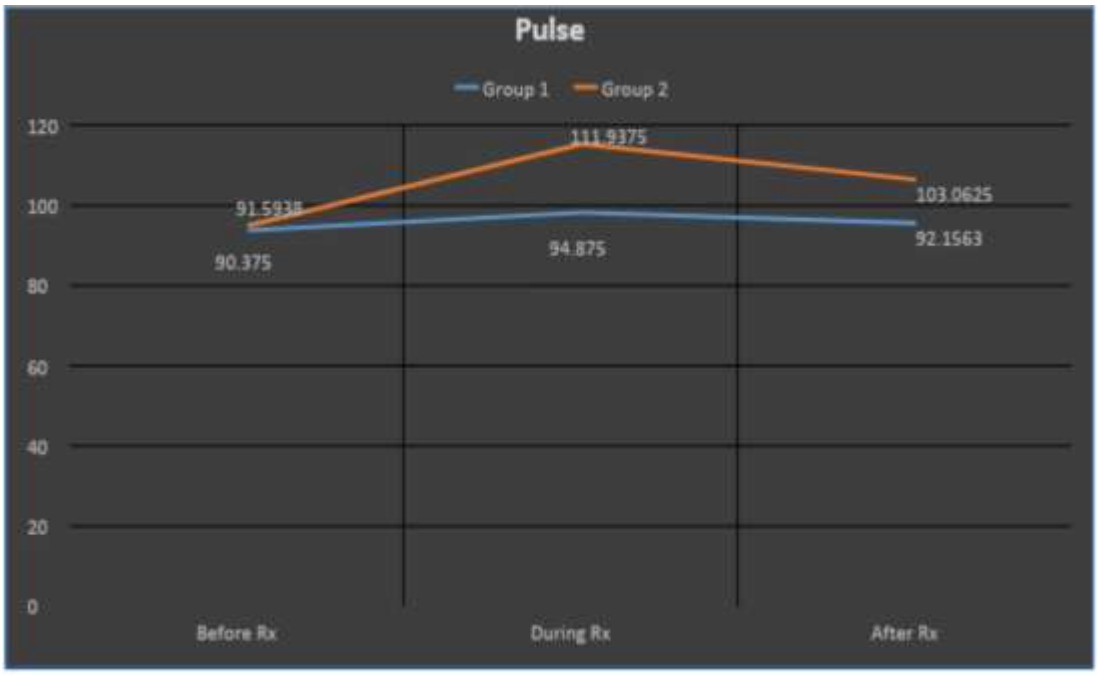
Graph 7. Comparison of SEM scale between group 1 and group 2



Graph 8. Comparison of SpO2 at different time periods between group 1 and group 2



Graph 9. Comparison of Pulse rate at different time intervals between group 1 and group 2



Annexure 1

CASE HISTORY PROFORMA

VSPM DENTAL COLLEGE AND RESEARCH CENTRE
DEPARTMENT OF PEDIATRIC AND PREVENTIVE DENTISTRY

EFFECTIVENESS OF ACUPRESSURE ON PAIN EXPERIENCE DURING INFERIOR ALVEOLAR NERVE BLOCK INJECTION IN CHILDREN AGED 5-10-YEAR-OLD – AN EXPERIMENTAL STUDY.

EXAMINATION PROFORMA/CASE RECORD FORM

Identification No. ☐☐ (1 2) Day ☐☐ (3 4) Month ☐☐ (5 6) Year ☐☐☐☐ (7 8 9 10) Examiner Orig/Dupl ☐ | ☐ (11 12) Group ☐ (13)

GENERAL INFORMATION:

Name of child: _____

Gender: ☐ (14) 1=M, 2=F

Age: ☐ (15) years ☐ (16) months

Studying in class: ☐ (17)

Name and Address of parent:

_____

_____

_____Contact No. of Parent: _____

Chief Complaint:

H/O Present illness:

Past Medical History:

Past Dental History:

Behaviour Assessment as per Frankl Behavior rating scale: ☐

18

General examination

- **Weight** ☐

19

- **Height** ☐

20

I. Extra Oral examination

- Facial Form:
- Facial symmetry:
- Facial profile:
- Swelling on face and jaws:
- Lymph nodes:

II. Intra oral examination

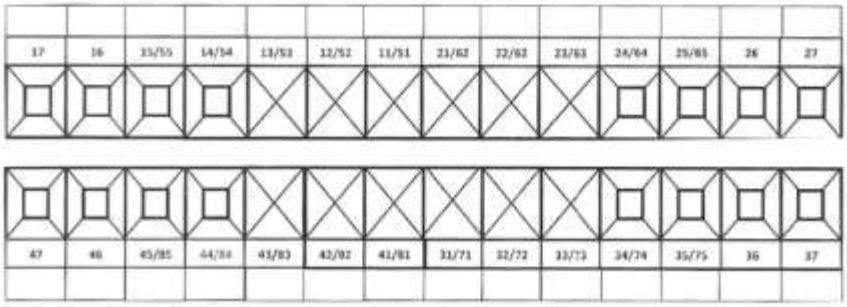
A. Examination of Soft tissues

- Gingiva
- Oral mucosa
- Floor of mouth
- Tongue
- Palate

B. Examination of Hard tissues:

- Teeth Present (FDI notation)

III. Dentition Status & Treatment Need:



Primary teeth Crown	Permanent teeth Crown	Status	Treatment
A	0	Sound	0= none
B	1	Decayed	P= Preventive, caries arresting care
C	2	Filled, with decay	F= Fissure sealant
D	3	Filled, no decay	1= One surface filling
E	4	Missing, as a result of caries	2= Two or more surfaces filling
—	5	Missing, any other reason	3= Crown for any reason
F	6	Fissure sealant	4= Veneer or laminate
G	7	Crown	5= Pulp care and restoration
—	8	Unerupted tooth (crown)or exposed root	6= Extraction
			7= Need for other care (specify)
T	T	Trauma (fracture)	8= Need for other care (specify)
—	9	Not recorded	9= not recorded

- DMFT Score

D	M	F	T	DMFT Score

IV. Radiograph:

V. Diagnosis:

VI. Treatment Plan:

Patient Identity No	Pain On Injection	
	Subjective (Wong –baker scale)	Objective (SEM)

VII. Assessment:

- **Adverse Effects (If Any)**

Wong-Baker FACES® Pain Rating Scale

0	2	4	6	8	10
No Hurt	Hurts Little Bit	Hurts Little More	Hurts Even More	Hurts Whole Lot	Hurts Worst

Instructions for Usage

Explain to the person that each face represents a person who has no pain (hurt), or some, or a lot of pain.

Face 0 doesn't hurt at all. Face 2 hurts just a little bit. Face 4 hurts a little bit more. Face 6 hurts even more. Face 8 hurt a whole lot. Face 10 hurts as much as you can imagine, although you don't have to be crying to have this worst pain.

Ask the person to choose the face that best depicts the pain they are experiencing.

*Wong, D. and Baker, C.: Pain in children: comparison of assessment scales, Pediatric Nursing1988;14(1):9-17

SOUND , EYE & MOTOR SCALE

Score	Designation	Sounds	Eyes	Motor
0	Comfort	No sound indicating pain	No eye signs of discomfort	Hands, relaxed, no apparent body tenseness
1	Mild discomfort	Nonspecific possible pain indication	Eyes wide show of concern, no tears	Hands show some tension
2	Moderately painful	Specific verbal complaint e.g. ow! Voice raised	Watery eyes	Random movement of arms/body grimace, twitch
3	Painful	Verbal complaint indicates intense pain	Crying tears running down the face	Movement of hands to make aggressive physical contact, pulling head away punching

Annexure 2

DEPARTMENT OF PEDIATRIC & PREVENTIVE DENTISTRY

Certificate of Consent

I have read the foregoing information, or it has been read to me. I have had the opportunity to ask questions about it and any questions that I have asked have been answered to my satisfaction. I consent voluntarily to participate as a participant in this research.

I acknowledge the "Specially designed proforma", and also the doctor has informed me about this research project suitably and sufficiently to my satisfaction. I agree to let my child"s oral examination to be taken as required. I agree to take part in this project. I shall co-operate with the doctors, in all respects. I permit to publishing the results of my participation in this study. I shall not be given any reimbursement or compensation. I have been informed of my right to opt out of this research project at any time without giving any reason for doing so. I hereby record my consent for participation in the said project.

.....	.....	.....	.....
Parent's/guardian's name	Signature/thumbprint	Date	Time
.....	.....	.....	.....
Investigator's name	Signature	Date	Time

If illiterate a literate witness must sign (if possible, this person should be selected by the participant and should have no connection to the research team). Participants who are illiterate should include their thumb print as well.

I have witnessed the accurate reading of the consent form to the potential participant, and the individual has had the opportunity to ask questions. I confirm that the individual has given consent
freely.

Name of witness_____

Signature of witness _____

Date _____

Day/month/year

Thumb print of participant

V.S.P.M DENTAL COLLEGE & RESEARCH CENTRE

DEPARTMENT OF PEDIATRIC & PREVENTIVE DENTISTRY

संमती प्रमाणपत्र

मी खाली दिलेली माहिती वाचली आहे, किंवा मला वाचन दिले गेले आहे. मला प्रश्न विचारण्याची संधी दिली गेली आणि मी जे विचारले होते ते समाधान माझ्या समाधानानुसार देण्यात आले. मी या संशोधनात सहभागी म्हणून स्वेच्छेने सहभाग घेण्यास सहमती देतो.

मी "विशेष रूपाने डिझाइन केलेले प्रोफार्मा" मान्य करतो आणि डॉक्टरांनी मला या संशोधन प्रकल्पाबद्दल योग्य आणि पुरेशी माझी समाधानकारक माहिती दिली आहे. माझ्या मुलाच्या तोंडी परीक्षा आवश्यकतेनुसार घेण्यास मी सहमत आहे. मी या प्रकल्पात भाग घेण्यास सहमती देतो. मी सर्व बाबतीत, डॉक्टरांशी सहकार्य करू. या अभ्यासात मी माझ्या सहभागाचे निकाल प्रकाशित करण्यास परवानगी देतो. मी कोणत्याही परतावा किंवा नुकसान भरपाई दिली जाणार नाही. असे करण्यासाठी कोणत्याही कारण न देता मला कोणत्याही वेळी या संशोधन प्रकल्पातून बाहेर पडण्याचा अधिकार मिळालेला आहे. मी याद्वारे प्रोजेक्टमध्ये सहभागाबद्दल माझी संमती नोंदवित आहे.

.....	.....	.....	.....
पालकांचे / संरक्षक नाव	सही / अंगठा मुद्रण	तारीख	वेळ
.....	.....	.....	.....
अन्वेषणकर्त्याचे नाव	स्वाक्षरी	तारीख	वेळ

निरक्षर असल्यास साक्षर साक्षीदारांनी सही करणे आवश्यक आहे (जर शक्य असेल तर, या व्यक्तीला निवडकाने निवडले पाहिजे आणि त्यास शोध पथकाशी कोणतेही कनेक्शन नसावे). निरक्षर असणार्या सहभागींमध्ये त्यांचे थंब मुद्रण तसेच त्यांचा समावेश असावा.

मी संभाव्य सहभागास संमती फॉर्मचे अचूक वाचन केले आहे, आणि व्यक्तीस त्याला प्रश्न विचारण्याची संधी मिळाली आहे. मी पुष्टी करतो की व्यक्ती स्वतंत्रपणे संमती दिली आहे.

सहभागी व्यक्तीचे अंगठा

साक्षीदारांचे नाव _____

साक्षीची स्वाक्षरी _____

तारीख _____

दिवस / महिना / वर्ष

MASTER CHART I

DEMOGRAPHIC DETAILS				VISIT 1 ASSESSMEMT		VISIT 2 ASSESSMENT							
						Pain on Injection							
ID no	Gender	DOB	Age	Frankl rating	Weight	(Subjective) Wong Baker Scale	(Objective) SEM Scale	Physiologic assessment					
								SPO2			Pulse		
								Before treatment	During treatment	After treatment	Before treatment	During treatment	After treatment
I-01	2	28/9/13	8.35	4	23	2	2	98%	98%	98%	84	86	85
I-02	2	11/6/12	9.65	4	21	2	2	98%	97%	98%	100	102	100
I-03	2	02/07/12	9.6	3	25.45	2	2	99%	99%	99%	100	108	105
I-04	2	15/05/13	8.72	4	27	4	2	98%	97%	98%	82	86	82
I-05	2	03/11/12	9.26	3	21	2	2	98%	99%	99%	102	109	108
I-06	2	07/02/12	10.8	3	15.5	10	4	99%	98%	97%	103	109	101
I-07	1	18/01/16	6.5	4	18	2	1	99%	99%	98%	91	93	91
I-08	2	27/01/14	8.3	4	14	4	2	99%	99%	99%	100	106	106
I-09	2	19/03/14	7.87	3	18.5	2	2	97%	96%	97%	93	97	93
I-10	1	24/03/12	9.86	4	25	4	2	98%	97%	98%	97	108	97
I-11	1	15/08/12	9.47	3	35	2	2	99%	99%	99%	101	102	101
I-12	2	16/02/12	9.96	3	36	2	1	99%	99%	98%	98	101	100
I-13	1	13/08/12	9.47	4	30	2	2	94%	92%	93%	92	97	96
I-14	2	23/08/12	9.45	4	28	2	1	99%	99%	99%	93	99	98
I-15	2	22/03/15	6.86	4	26	0	1	99%	98%	98%	97	100	98
I-16	1	29/04/13	8.76	3	29	2	2	96%	96%	96%	72	80	80
I-17	2	10/01/15	7.8	4	21	2	2	98%	98%	98%	101	108	104
I-18	1	29/05/15	6.68	3	26	2	2	98%	97%	98%	100	102	100
I-19	2	08/02/17	5.54	4	20	0	1	97%	97%	97%	102	104	103
I-20	2	25/02/14	7.93	3	24	2	1	92%	91%	92%	67	69	66
I-21	1	21/07/12	9.54	3	39	0	1	96%	94%	95%	61	67	62
I-22	2	27/02/12	9.93	4	32	2	1	98%	96%	97%	93	96	93
I-23	2	02/03/12	9.92	3	29	0	1	96%	96%	96%	91	94	93
I-24	2	16/12/14	7.14	4	30	0	1	99%	99%	99%	79	82	80
I-25	2	19/10/12	9.29	4	33	2	1	98%	98%	98%	95	99	98
I-26	2	15/08/14	7.47	4	26	2	2	98%	98%	98%	80	84	83
I-27	2	18/02/12	9.96	3	21	2	2	98%	98%	98%	92	94	93
I-28	1	26/01/13	9.3	3	19	0	1	97%	96%	97%	81	86	82
I-29	1	12/01/14	8.7	4	31.5	2	2	98%	96%	97%	85	92	86
I-30	1	09/05/15	6.7	3	29.8	2	2	98%	97%	98%	73	79	75
I-31	1	18/07/12	9.5	3	25	2	1	97%	97%	97%	98	103	100
I-32	1	13/12/13	8.15	4	31	0	1	97%	96%	97%	89	94	90

MASTER CHAR II

DEMOGRAPHIC DETAILS				VISIT 1 ASSESSMEMT		VISIT 2 ASSESSMENT							
						Pain on Injection							
ID no	Gender	DOB	Age	Frankl rating	Weight	(Subjective) Wong Baker Scale	(Objective) SEM Scale	Physiologic assessment					
								SPO2			Pulse		
								Before treatment	During treatment	After treatment	Before treatment	During treatment	After treatment
II-01	1	13/02/12	9.97	4	23	6	2	96%	99%	99%	102	132	122
II-02	1	18/03/12	9.87	4	24	2	2	98%	94%	97%	94	106	102
II-03	1	03/05/12	9.75	3	34	2	2	99%	96%	98%	100	116	102
II-04	2	15/05/13	7.8	4	24	8	3	99%	90%	96%	63	102	100
II-05	2	11/03/12	9.3	3	21	10	4	97%	90%	93%	100	126	102
II-06	1	09/04/12	9.8	4	29	6	2	99%	98%	99%	123	146	129
II-07	2	13/01/15	7.6	4	15	4	2	97%	94%	96%	96	113	106
II-08	1	01/01/14	8.1	3	27	2	3	96%	90%	94%	97	108	101
II-09	1	29/04/13	8.76	4	29	6	3	97%	94%	95%	89	119	106
II-10	2	25/02/12	9.9	4	27.5	4	3	94%	89%	93%	101	116	102
II-11	1	28/01/12	10.2	4	33	4	3	99%	84%	87%	97	101	94
II-12	1	22/02/12	9.94	3	26	4	2	99%	96%	95%	101	112	94
II-13	2	18/07/14	7.5	4	23	2	3	97%	89%	91%	96	127	115
II-14	2	09/10/12	9.33	4	25.5	2	2	96%	89%	92%	97	116	109
II-15	1	26/12/11	10.8	3	26	4	3	94%	91%	92%	96	117	107
II-16	1	29/09/13	8.3	4	27	6	3	99%	90%	93%	107	108	101
II-17	2	19/03/15	6.87	4	36	4	3	97%	91%	93%	92	121	119
II-18	1	08/08/16	5.43	3	23	8	4	97%	91%	93%	86	129	114
II-19	2	11/09/14	7.4	3	39	10	4	97%	89%	90%	101	129	113
II-20	1	02/04/12	9.84	3	26	8	3	96%	92%	93%	90	129	119
II-21	2	13/12/15	6.15	3	29	8	3	93%	86%	91%	89	116	102
II-22	2	17/02/12	9.9	3	30	8	4	94%	91%	91%	86	106	101
II-23	1	06/04/13	8.83	4	31	8	3	98%	94%	94%	93	136	122
II-24	2	23/07/13	8.53	3	32	8	4	98%	94%	91%	99	126	116
II-25	1	27/08/16	5.44	4	19	4	3	96%	94%	96%	101	123	116
II-26	2	29/07/15	6.5	4	32.5	2	2	99%	97%	98%	71	83	82
II-27	2	16/10/13	8.3	4	26	2	2	98%	91%	92%	75	89	80
II-28	1	25/09/16	5.36	4	19.5	6	2	96%	92%	94%	69	73	73
II-29	1	22/06/14	7.6	3	23	2	4	99%	97%	98%	67	71	70
II-30	2	09/09/12	9.4	4	29	2	2	91%	89%	90%	77	89	86
II-31	1	07/12/15	6.2	3	34	4	2	94%	91%	93%	85	94	94
II-32	2	08/03/13	8.9	4	37	8	4	97%	95%	92%	91	103	99