COMPARATIVE EVALUATION OF THE 2% LIGNOCAINE & 20% BENZOCAINE ANESTHETIC GELS IN REDUCING PAIN PRIOR TO INFERIOR ALVEOLAR NERVE BLOCK

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ABSTRACT

INTRODUCTION:

Topical anesthetic agents are widely used in the field of dentistry to reduce pain and apprehension during administration of local anesthesia. Various topical anesthetic agents are available, among which the most commonly used ones are lignocaine and benzocaine. Hence we planned this study to compare and evaluate the efficacy of topical anesthesia on needle insertion pain prior to administration of inferior alveolar nerve block.

MATERIALS & METHOD:

This clinical study included 30 adults of 18-35 years of age who were divided equally into two groups: Group A-2% lignocaine hydrochloride gel (Lox 2%) and Group B-20% benzocaine gel (ProGel-B). The intervention involved assessment of pain perception by the individuals after administration of inferior alveolar nerve block. The pain assessment was done using a Visual analogue scale (VAS). The ratings were subjected to statistical analysis using SPSS version 23.0

RESULTS:

Lignocaine when used as a topical anesthetic agent showed lower mean scores under both the pain scales when compared with benzocaine but the results were statistically insignificant.

CONCLUSION:

This study demonstrates that there is a highly significant difference between the topical anesthetic efficacy of 2% lignocaine and 20% benzocaine prior to inferior alveolar nerve block. Twenty percent benzocaine showed more pain results than 2% lignocaine during the needle insertion.

INTRODUCTION:

In the realm of dental care, patient experience is paramount, and pain management plays a pivotal role in shaping the overall perception of dental procedures. The Inferior Alveolar Nerve Block, a routine but potentially discomforting procedure, demands meticulous attention to the choice of anesthetic agents to ensure not only efficacy but also patient satisfaction. (1)As we delve into the intricate landscape of dental anesthesia, it becomes apparent that Lidocaine and Benzocaine represent two stalwarts in the arsenal of anesthetic options.(2) The former, a well-established amide local anesthetic, has earned its place as a standard choice in various dental procedures owing to its rapid onset and reliable analgesic properties. On the other hand, Benzocaine, a potent ester local anesthetic, boasts a distinct profile characterized by rapid onset and, in some instances, prolonged duration of action.(3) These divergent characteristics lay the foundation for a compelling comparative analysis that extends beyond mere efficacy to encompass considerations of onset time, duration of action, and potential side effects.(4)

The choice between Lidocaine and Benzocaine becomes particularly critical in the context of IANB, a procedure notorious for its potential to induce discomfort. Achieving effective pain management during this procedure not only enhances patient comfort but also contributes to a smoother workflow for the dental practitioner. (5), (6). The former, known for its rapid onset and reliable analgesic properties, has entrenched itself as a standard choice in various dental procedures. In contrast, the latter boasts a distinct profile characterized by rapid onset and, in certain instances, prolonged duration of action. (7)Pain management in dental procedures is not a mere clinical concern; it is a fundamental aspect of patient experience that significantly influences their perception of dental care(8).As we scrutinize pain intensity, the immediate focus is on the efficacy of Lidocaine and Benzocaine in providing rapid and profound pain relief.(9) The onset of action, a pivotal determinant in the clinical setting, is meticulously evaluated to discern whether one agent holds a significant advantage over the other. (10)(11).

Beyond pain intensity, the duration of action assumes prominence, with Benzocaine's potential for prolonged anesthesia inviting a closer examination.(12) This characteristic may prove advantageous in scenarios where an extended period of pain control is paramount, potentially influencing the choice of anesthetic agent.(13). A gel's success in mitigating pain must be complemented by its ability to enhance the patient's journey through the procedure.

MATERIALS & METHOD:

Study setting:

This study was conducted in Saveetha dental college, patients who reported to saveetha dental college, chennai were included for this study.

The study consisted of 30 healthy individuals (14 males and 16 females) in the age group of 18-35 years. Prior to the participation in this study, a medical history was acquired from all the participants, and a brief oral examination was done.

Inclusion criteria:

1.The individuals were required to present with at least one lower tooth indicated for extraction
2.Individuals falling under the category of ASA I and ASA II were included in the trial.

Exclusion criteria:

1.Individuals with a history of hypersensitivity reactions to anesthetic agents
2.Recent trauma to oral tissues
3.Patients taking medications which suppress the CNS such as diazepam, chlordiazepoxide HCl, alprazolam, etc.

An informed consent was obtained from the participants. The mandibular posterior areas such as retromandibular raphe and the buccal vestibule were chosen for application of the topical anesthetic agent. The site of application of the topical anesthetic agent and the needle were dried with gauze.

The individuals were randomly divided into two groups: Group A being 2% lignocaine gel and Group B being 20% benzocaine gel. The topical anesthetic gel was applied to the test area using a cotton swab applicator that was completely dipped in the gel by the investigator . Following this, 1.5 ml of local anesthetic agent was administered preceded by aspiration through inferior alveolar nerve block onto the areas that were surface anesthetized.

During the administration of local anesthesia, the response of the patient was constantly observed by the investigator. Following this, each participant was advised to quantify the pain perception by visual analogue scale.

RESULTS & DISCUSSION:

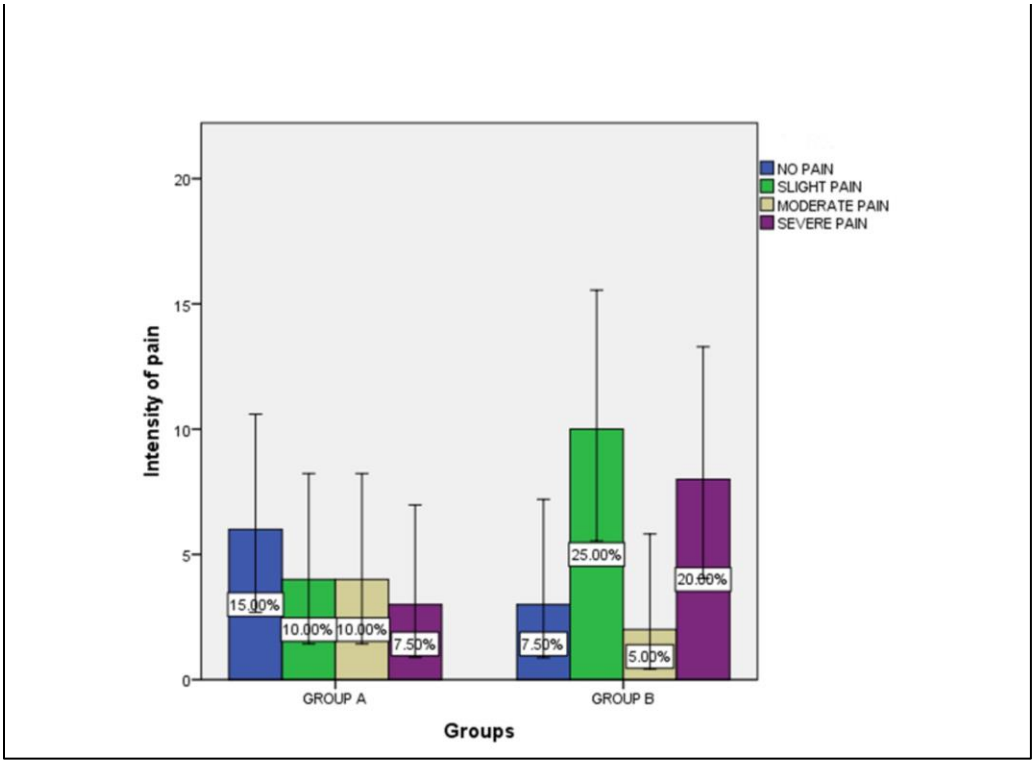

Figure.1: This graph shows the correlation between two groups of anesthetic gels and the intensity of pain.

Local anesthesia is a combination of two Greek words “an” (without) and “aesthesis” (sensation). In dentistry, local anesthesia is classified on the basis of their effects as (a) Conduction anesthesia, (b) Infiltration anesthesia, and (c) Topical anesthesia. Local anesthetics are classified into ester linkage agents (benzocaine) and amide linkage agents (lignocaine) and are the most widely used topical anesthetic agents. (14)Topical anesthesia can be defined as loss of sensation on the mucous membrane that is produced by direct application. (15)

The first local anesthetic was a topical anesthetic, that is, cocaine and was discovered in 1860 by Albert Niemann.(16). It is eliminated from the body through the liver; hence, its

metabolism is compromised in patients with liver dysfunction (17,18). Lidocaine acts by blocking the sodium channels, and topical administration of the same blocks ectopic discharges from afferent fibers. Topical application of lidocaine slows down the peripheral nociceptor sensitization and central hyperexcitability.(19)

Topical anesthesia targets the free nerve-endings that reversibly blocks nerve conduction near the site of administration, which in turn induces a temporary loss of sensation in that area. (20)The permeability of cell membrane to sodium ions is decreased, and therefore, nerve conduction is blocked. This eventually decreases the depolarization and increases the excitability threshold until the capacity to induce action potential is completely lost. Topical anesthetic agents do not contain vasoconstrictor as it weakens the mucosal permeability. (21)In addition, topical anesthetics are more concentrated than injectable ones to promote diffusion within the mucosa.

The present study was conducted among 30 individuals (14 males and 16 females) in the age range of 18-35 years to evaluate the efficacy of 2% lignocaine and 20% benzocaine as a topical anesthetic agent. Topical anesthesia was used prior to administration of nerve block. To standardize the protocol, only mandibular arch and therefore inferior alveolar nerve block were included. This study showed a significant difference between the mean pain scores in Group A and Group B. Both the topical anesthetic agents were applied gently over the surface for 30s and left for 1 min.

Riya parikh *et al.* compared topical anesthetic agents in dosage forms and reported that effectiveness of 5% lidocaine and 20% benzocaine for topical numbing, both were found to be equally effective and may provide relief from pain (22). In a study, benzocaine gel and lignocaine spray were compared, and the results revealed that benzocaine gel had the least VAS score than lignocaine spray, which corresponds to the findings of the present study.(23), (24)A clinical study of 510 extractions (Grade II and III) were carried out with lignocaine hydrochloride gel 5% and bupivacaine hydrochloride gel 5% as topical agents, and it was concluded that 5% lignocaine hydrochloride gel was better than 5% bupivacaine hydrochloride gel. In a clinical trial, 2% lignocaine gel and 20% benzocaine gel were compared with placebo, and it was concluded that the effectiveness of both 2% lignocaine and 20% benzocaine were similar.

CONCLUSION:

This study demonstrates that there is a significant difference between the two anaesthetic agents and lignocaine 2% was considered to be effective in reducing pain prior to administration of inferior alveolar nerve block when compared to benzocaine 20% gel.

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