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Twin Mix Anesthesia

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Abstract

The recent researches shows that, the use of dexamethasone along with the local anesthetics are enhancing the outcome block characteristics and improved pain and suppression. Addition of dexamethasone, render the final PH of the mixture more basic. Increasing the PH decreases the pain, shorter onset and longer duration of anesthesia with reduction of sting like sensation on injection. It is a combination of local anesthetic solution and a steroid. This procedure is popularly known as twin mix. Intra space pterygomandibular twin mix anesthesia is a novel technique for inferior alveolar nerve block used for mandibular anesthesia. This technique has advantages in improving the quality of life in the post-operative period after mandibular oral surgical procedures, shortening the latency and prolonging the duration of soft tissue anesthesia.

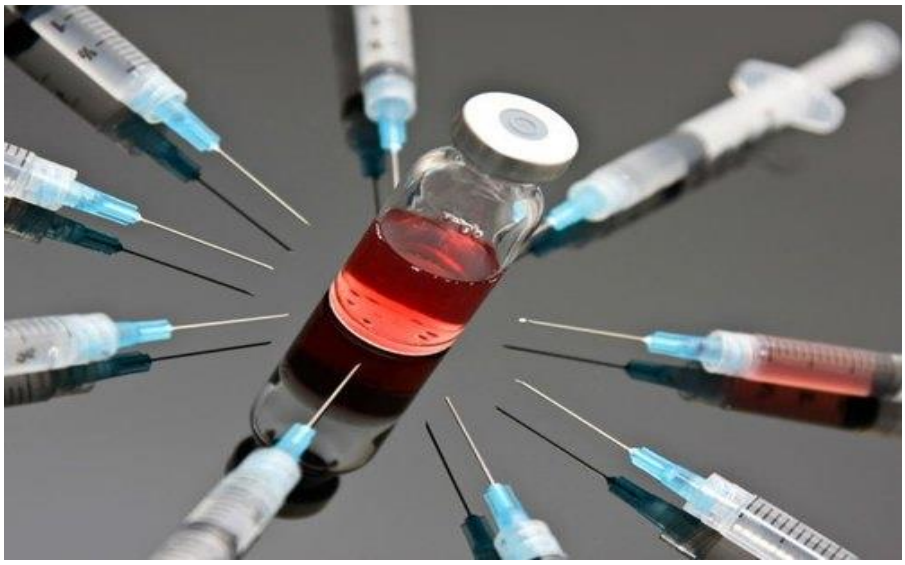

Figure 1

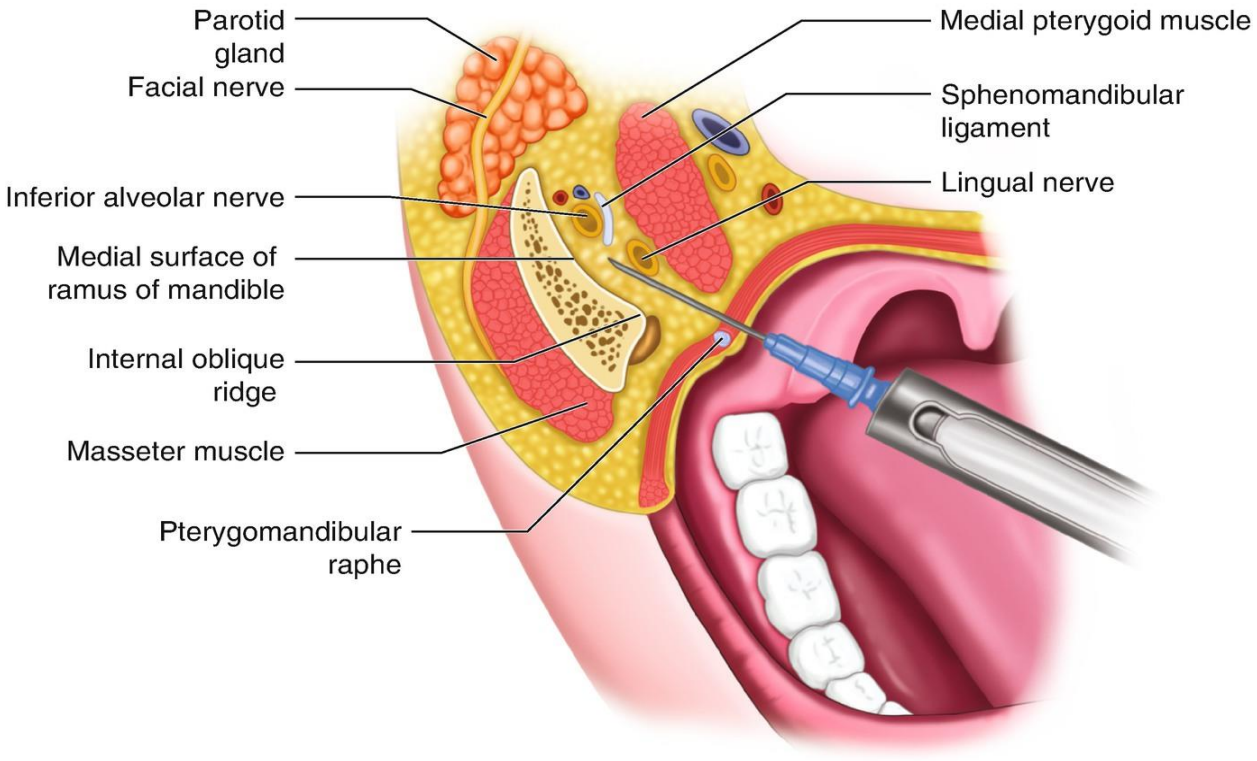

Figure 2

Introduction

- The mandible is the largest bone in the human skull and the only skull bone that is mobile, allowing the bone to contribute to mastication.
- It is commonly involved in impacted third molars, and facial traumas resulting in an isolated fracture or associated with other facial bones due to its prominent location in the facial skeleton.
- The twin mix anesthesia has recently gained popularity in the clinical practice posing several advantages over the conventional routes of drug administration.
- This procedure is a combination of a local anesthetic solution and a steroid.
- The results are better jaw functions and mouth openings and also exhibited reduced difficulty in mastication and ability to purse the lower lip on the third post-operative day.
- Twin mix solution proves to be superior as compared to the conventional LA solution as it offers improved clinical outcomes enhancing the quality of life post-operatively in person.
- The dexamethasone solution of local anesthesia is a freshly prepared mixture of 1.8ml of 2% lignocaine with adrenaline(1:200000) and 1ml (4mg) dexamethasone making 2.8ml solution of twin mix.
- The 1.8ml anesthetic solution is composed of lignocaine hydrochloride(21.3mg/ml), adrenaline(0.005mg/ml), Sodium chloride (6.0mg/ml), sodium metabisulphite (0.5mg/ml), methylparaben(1.0mg/ml) and distil water for injection as a vehicle.
- The 1ml dexamethasone solution used for the combination contains dexamethasone sodium phosphate(4mg/ml), sodium methylparaben(0.15% w/v), sodium propylparaben (0.02 w/v) and distilled water for injection.

Corticosteroid (1 ml)	Local anesthetic (1.8 ml)
Dexamethasone sodium phosphate IP 4 mg/ml	Lignocaine hydrochloride IP 21.3 mg/ml
Sodium methylparaben IP 0.15% *w/v*	Adrenaline (as bitartrate) IP 0.005 mg/ml
Sodium propylparaben IP 0.02% *w/v*	Sodium chloride IP 6.0 mg/ml
Water for injection IP q.s	Sodium metabisulfite IP 0.5 mg/ml
	Methyleparaben IP 1.0 mg/ml
	Water for injection IP to make 1 ml

Figure 3

Administration

- The analysis of the chemical stability of both the chemicals together was done using double beam UV – visible spectrophotometry.
- The photo-spectrometric wavelength of lignocaine and dexamethasone in twin mix is in the spectrum of 223nm and 291.5nm respectively.
- The PH of twin mix anesthesia range from5.5 to 6 the freshly prepared mixture can also demonstrate clinically.

Figure 4

Why Dexamethasone?

Figure 5

- Dexamethasone, a corticosteroid is an anti-inflammatory agent and an immunosuppressant. Its anti-inflammatory potency is 20-30 times when compared to cortisol.

- Dexamethasone exerts potent anti-inflammatory action by inducing the synthesis of endogenous proteins, which block the enzymatic activation of phospholipase A2.
- This, in turn, inhibits arachidonic acid release by the cell membrane, with inhibition of the synthesis of prostaglandins, leukotrienes, or substances related to thromboxane.
- Dexamethasone is known to block superoxide production and lysosomal enzyme release in human polymorphonuclear neutrophils inhibiting the functional responses of degranulation.
- The probable action of dexamethasone on human polymorphonuclear leucocytes is by membrane-bound calcium release.
- Addition of dexamethasone to 2 % lignocaine with 1:200000 epinephrine renders the final PH of the mixture more basic (ph=6).
- LA's in solution exists in equilibrium between the basic uncharged (non-ionized) form, which is lipid-soluble, and the charged(ionized) cationic form, which is water-soluble.
- Lipid soluble, non-ionized for a form of the LA penetrates the neural sheath and membrane(tissue penetration).
- The ionized form of the LA binds with the sodium channel and prevents propagating of impulses(clinical action).
- Altering the PH to a more basic solution, as in the case of twin mix, will increase the amount of non-ionized form compared to ionized form which will speed onset.
- Increase the PH of lidocaine to decrease the pain associated with its infiltration.

Method

- The mixture of 1.8ml and 2 % lignocaine(1:200000) anesthetic solution and dexamethasone 1ml(4mg) is prepared just before injecting for inferior alveolar nerve block.
- The mixture(twin mix) is deposited in pterygomandibular space following the standard technique of inferior alveolar nerve block using a Luer-lock type aspirating syringe with a long 26 gauge needle.
- The subjective symptoms conform the successful nerve block.

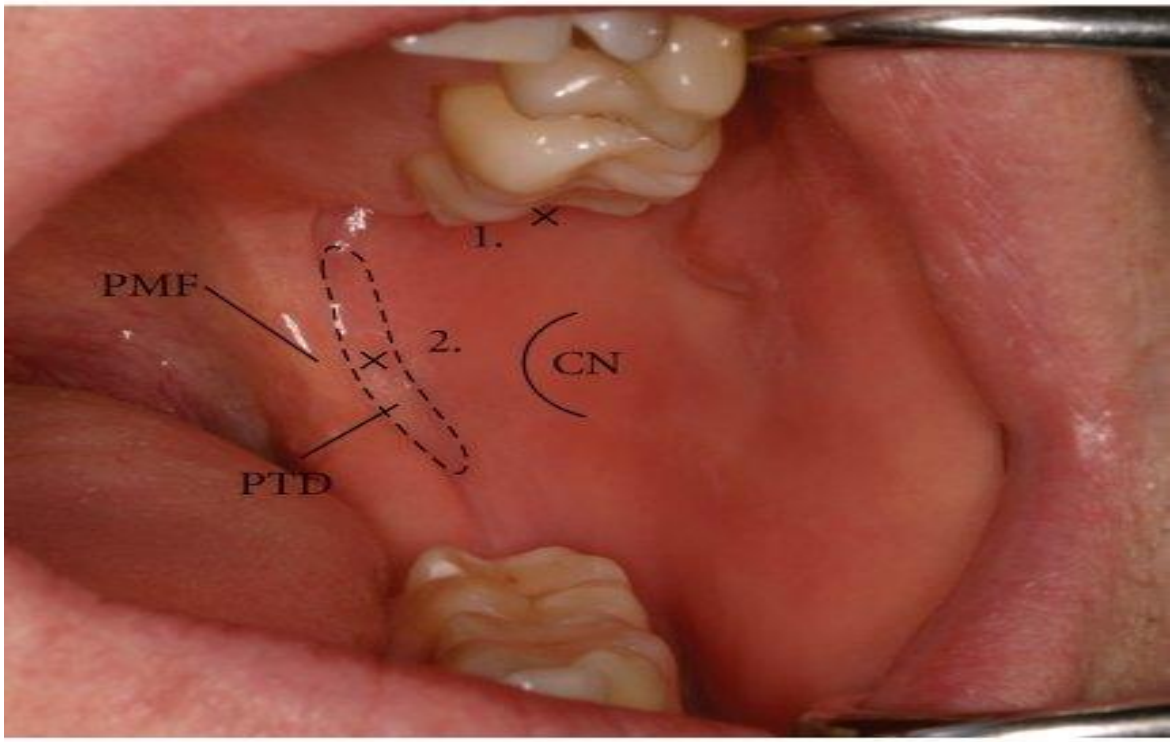

Figure 6

Advantages

- Ease of administration of the drug for oral and dental clinicians
- Lesser sting of local anesthetic injection due to the altered PH of the combination
- Short latency for local anesthetics
- Prolonged duration of the soft tissues anesthetics
- Improved quality of life in the post-operative period after the surgical procedure
- No clinical evidence of persistence neural damage
- No functional alteration after perineural administration of the drug
- Reduced post-operative edema and discomfort in patients due to presence of strong anti-inflammatory effects of steroid

Safety Issues

- The vasoconstrictor effects of dexamethasone, which may cause ischaemic changes in the nerve tissues if injected in the nerve proximity.
- Suggested that caution is required while using large doses of corticosteroid in nerve proximity as topical dexamethasone adversely affected neural condition in a dose-dependent manner.

Statistical Analysis

- It is been used in imparted mandibular third molar removal, as performing oral surgical procedures can lead to several postoperative complications, such as trismus, facial swelling, pain which results in inflammatory responses to surgery.
- From research operating the impacted mandibular third molar, it was concluded that 4mg pre-operative dexamethasone injection, the 8mg pre-operative
- Dexamethasone space was more effective in reading post-operative swelling and pain.
- choice.et.al, through their systematic review and meta-analysis of randomized trials on effects of dexamethasone as an LA adjuvant for nerve blocks in the British Journal of anesthesia, concluded that to date, dexamethasone appears to be the best method for prolonging as an adjuvant over clonidine, epinephrine or midazolam.

Discussion and Conclusion

- Twin mix the combination of local anesthetic solution and dexamethasone with a mixture of 2 percent lignocaine with 1;200000 epinephrine and 4mg dexamethasone is used as an intra space pterygomandibular injection for inferior alveolar nerve block in cases for mandibular impacted third molar, mandibular trauma.
- With several advantages this technique is clinically benefited based on the current evidence.
- The available research and statistical analysis of different authors have demonstrated that the use of this technique, in the doses used are clinically safe.

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