

International Journal of Advanced Research in Biological Sciences

www.ijarbs.com



Research Article

The anesthetic and behaviour management potential of the flower *Spilanthus calva*

Savitha Sathyaprasad

Sr. Prof and HOD, department of Pedodontics and Preventive dentistry, KVG Dental college and Hospital, Sullia, Karnataka, India

*Corresponding author e-mail: drsavithaks@yahoo.com

Abstract

Spilanthus calva is a flower known for its medicinal and anesthetic properties. It has been used in India for centuries as a remedy for toothache and gingivitis without any toxic effects. The concept of a flower used instead of an injection for anesthesia was tried to evaluate the hypnotic effect on child behaviour. The efficacy of *Spilanthus calva* as an anesthetic for the extraction of mobile deciduous teeth in 40 children was compared with that of infiltration lignocaine injection in a corresponding number of controls. The anesthetic property was evaluated using the visual analog scale to determine the pain, felt during the procedure and Facial Image Scale to assess the fear felt during the procedure. The findings indicate that *Spilanthus calva* is as efficacious as lignocaine in reducing the pain of extraction and causes significantly less fear of extraction for the removal of mobile deciduous teeth.

Keywords: *Spilanthus-calva*, lignocaine, local anesthesia; behaviour-management.

Introduction

Various dental treatments impose considerable dental fear in children. Of these, extractions and the fear of the injection associated with it have always generated the greatest fear (Ghose, 1964). Children with dental fear tend to miss dental appointments and have a high level of dental caries and deteriorating dental health (Breggen and Mynert, 1984). Also as fears may be transmitted from parent to child, children with dental fears grow up and transfer these fears to their children (Halberg et al., 2008). Thus a technique of extraction in children must not only be painless but also reduce the fear of the procedure in the child so as to instill a positive dental attitude.

Spilanthus calva a medicinal plant which has been used in traditional Indian medicine for centuries belongs to the family *Compositae* and is used for the treatment of toothache and gingivitis (Jayasinghe, 1994). Popularly known as "Toothache plants"; the genus *Spilanthus* consists of annual herbs, or short-lived perennials, approximately half meter tall with prostrate or ascending branched cylindrical hairy stems and simple ovate opposite leaves with stipules. Widely distributed in tropics and sub-tropics including tropical America, North Australia, Africa, Malaya, Borneo, India, Sri Lanka (Altaffer, 2005; Jayaweera, 1981), about sixty species of *Spilanthus* have been reported from

various parts of the world (Jansen, 1981). The genus occurs widely in damp pastures, at swamp margins, on rocks near the sea and as a weed of road-sides and cultivations (Jansen, 1981). *Spilanthus calva* has a bright yellow flower and the flower head, when chewed, produces a numbing effect (Fig 1). The extracts of *Spilanthus calva* have been shown to be non toxic (Palpu, 2006). Its action is due to the local anesthetic properties of the N-isobutyl amides (spilanthol, undeca- 2E,7Z,9E-trienoic acid isobutylamide and undeca-2E-en-8,10-diyonic acid isobutylomide) (Ramsewak et al., 1999).

The extraction of a mobile deciduous tooth often requires the injection of a local anesthetic agent. The fear of the injection in such cases presents a far greater challenge to the dentist than the relatively simple procedure of extracting the tooth. One of the probable advantages of using a brightly coloured flower as an anesthetic agent is that the flower head can be used as a behaviour management tool to motivate the patient. Hence the purpose of this study was to evaluate the efficacy of the flower *Spilanthus calva* as an anesthetic agent and record the fear produced during the procedure, when compared with infiltration anesthesia for the extraction of a deciduous tooth with preshedding mobility.

Materials and Methods

The study was conducted after the approval of the ethical committee of the institution and included 80 children between the ages of 6-11 years reporting to the department of Pedodontics and Preventive Dentistry KVG Dental College Sullia, with a complaint of pre-shedding mobility. Children with acute infections, contraindications of extractions and mental disability were excluded from the study. After obtaining parental consent the subjects were with grade II mobility of deciduous teeth were randomly divided into two groups of 40 children each. Group A consisted of children who underwent extraction with Lignocaine infiltration for securing local anesthesia, while Group B consisted of children who underwent extraction with a paste of

Spilanthus calva. Before the extraction, children of the *Spilanthus* group were shown the flower, and told that it was a 'magic' plant that would make the extraction painless. The paste of *Spilanthus calva* flower head was made by crushing the fresh flowers in a mortar and pestle and applied around the mobile tooth area and left for 30s to 1 min after which the tooth was extracted.

Both groups of children were interviewed after the procedure and asked to mark the fear scales. The children were asked to describe the amount of pain they felt on a visual analog scale (Wilson, 2004) measuring 10cm and they were asked to pick the face that corresponded best to their state of fear on the facial image scale (Buchanan and Niven, 2002).

The pain and fear scores were recorded on a questionnaire (Table 2) and the scores were statistically evaluated using the student's t test.

Results

The sample consisted of a total of 80 children, 34 (42.5%) males and 46 (57.5%) females aged between 6 years to 11 years (mean age 8 years 4 months \pm 1.2 years). The average pain score for the lignocaine group was 1.352 which was lower than that of the *Spilanthus* group which had a score of 2.3; however this difference was not statistically significant. (Table 3).

When the fear scores were compared, children who underwent extraction with *Spilanthus calva* had a lower fear score (1.6500) when compared with the lignocaine group (3.5250). This difference was statistically very highly significant ($p < 0.001$). When the pain and fear scores for the extraction of molars and incisors were compared, the children who underwent extraction of molars experienced significantly higher scores of pain and fear, irrespective of the group of anesthetic agent used. (Table 4)

Discussion

The quest for a painless extraction has been the goal of dentistry for a long time. A paediatric dentist however, has to not only make the extraction

Table 1. Main features of *Spilanthus calva* when compared to Lignocaine

S.no	Properties	Lignocaine	<i>Spilanthus calva</i>
1.	Quantity needed for extraction	2ml	Paste of 1-2 flowers
2.	pH	Neutral to alkaline	5.4 (Acidic)
3.	Taste	Bitter	Pungent
4.	Form/nature	Liquid spray	Paste
5.	Duration of effect	3-4hr (injection)	2-5 min
6.	Vasoconstrictive additives	Added	Not known
7.	Analgesic properties*	Present	Present
8.	Fungicidal properties ⁵	Added	Present
9.	Antimicrobial properties ⁵	Added	Present

*Depending on the person

Table 2. Form for recording the anesthetic efficacy and dental fear of the patient in each group

Group -							
S.no	Name	Sex	Age	Place	Tooth incisor/molar	Observation	
						Dental fear	Pain
1.							
2.							
3.							
4.							
5.							
6.							
7.							
8.							
9.							
10.							

Table. 3 Pain score on the VAS

Class	N	Mean	Std.Deviation	t
Injection	40	1.3250	.97106	0.7505 P =0.414ns
<i>Spilanthus calva</i>	40	2.3000	1.18105	

The difference is not significant

Table 4. Fear Score on the Facial Image Scale

Class	N	Mean	Std.Deviation	t
Injection	40	3.5250	.81610	11.284 p =0.000 _{vhs}
<i>Spilanthus calva</i>	40	1.6500	.66216	

The difference is very highly significant

painless but also fearless. The role of anxiety by the management of pain is the need of the hour.

The properties of flowers of the *Spilanthus* family are known world over, with variants of the flower being used as a traditional remedy for dental ailments not only in the Indian Sub-continent but also in South America (Altaffer, 2005). However there is remarkably little dental literature pertaining to the efficacy or properties of the plant.

The Visual analog scale has been shown to be an accurate measure of the level of pain an individual may feel. The use of a pain questionnaire was not considered taking into account the age of the population.

The Facial Image Scale is a picture scale that has been shown to accurately measure the dental fear of children (Buchanan and Niven, 2002). The main indication for this scale is a sub-literate population (AAPD Reference Manual 2007). Considering the age and demographic profile of our study population the Facial Image scale was preferred over conventional scales for the measurement of dental anxiety such as the Corah's Dental Anxiety Scale (DAS) (Corah, 1969), which are parent questionnaires. As our study population was largely from a rural Indian area and we felt that the accuracy of the scale might be lost in the translation.

The pain scores show that although the extract of *Spilanthus* may be slightly less efficacious than lignocaine its use in the extraction of mobile teeth produces a level of anesthesia that is not significantly lower than lignocaine injection. The Fear scores of the *Spilanthus* group were significantly lower than those of the lignocaine group showing that *Spilanthus calva* is not only a useful anesthetic but also a potential behaviour management tool. The use of the term 'magic' flower and the bright color of the flower may have played a great part in the reduction of anxiety felt by these children.

Our data showed that children who underwent extraction of molars had significantly greater pain

and fear scores. However since this was true for both the *Spilanthus* and lignocaine group this could be due to the anatomy of these teeth rather than the efficacy of the anesthetic.

Conclusion

The results of this study show that *Spilanthus calva* has definite anesthetic properties. Furthermore the bright colour of the flower of this plant may serve as a useful tool in behaviour management. A detailed study on the extract of this flower is required to promote a potent natural anesthetic agent with an added benefit of managing a fearful child during the extraction of mobile tooth. This procedure can surpass the desensitization of the child to fear of injection making him an anxious patient who may develop dental anxiety throughout his life and even grow as an anxious parent with negative dental attitude.

References

- AAPD Reference Manual. 2007. *Pediatr. Dent.* 29(7) :115-123.
- Altaffer, P., 2005. Herbs and botanicals from south America.- *Neutraceutical World* 8(7): 32.
- Breggen, U., and Mynert, G. 1984. Dental fear and avoidance, causes, symptoms and consequences. *J. Am. Dent. Assoc.* 109: 247-251
- Buchanan, H., and Niven, N. 2002. Validation of a facial image scale to assess child dental anxiety. *Int. J. Paediatr. Dent.* 12:47-52
- Corah, N., 1969. Development of a dental anxiety scale. *J. Dent. Res.* 48:596
- Ghose, V. 1964. Determination of children's anxiety to various dental procedures through an assessment of heart rate. *J Dent Child.*
- Halberg, U., Camling I, Zickert A. et al., 2008. Dental appointment no shows, why do some parents fail to take children to the dentist? *Int. J. Paediatr. Dent* 1'8: 27-34
- Jansen, R.K., 1981. Systematics of *Spilanthus* (Compositae-Heliantheae). *Syst Bot.* 6(3):231.
- Jayasinghe, D.M., 1994. *Ayurveda Pharmacopeia*, Department of Ayurveda Colombo, Sri Lanka. pp.22.
- Jayaweera, D.M.A., 1981. Part 111, Medicinal plants

- National Science council of Sri Lanka, Columbo, Sri Lanka. pp. 71.
- Palpu, P., Rao, C.V, Rawat, A.J, and Ojha, S.K. 2006. United States Patent 20060141064.
- Ramsewak, R.S., Erickson, A.J. and Nair, M.G. 1999. Bioactive N-isobutylamides from the flower buds of *Spilanthes*. *Phytochem.* 51(6):729.
- Wilson, W., 2004. Non Pharmacological issues in pain perception. In Pinkham J et al (ed.) *Pediatric Dentistry, Infancy through Adolescence*. 4th Ed. Elsevier India. pp 96-106.
- .