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## CALENDULA IN HEALING OF EXTRACTION WOUNDS IN CHILDREN

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### Abstract:

**Purpose:** The purpose of this study was to evaluate the effect of topical application of Calendula tincture (7:3 dilution) on healing of extraction wounds in children.

**Materials and Methods:** A total of 58 children who required extractions of deciduous teeth were randomly divided into Group 1 (Calendula) and Group 2 (Control). Immediately after extraction, children from Group 1 and 2 received topical application of Calendula tincture and normal saline, respectively. Parameters including presence of pain, bleeding, healing were recorded 3, 7 and 10 days postoperatively. Obtained data were statistically analyzed. **Results:** Less children (33%) from the Calendula Group complained of post-operative pain and 26% reported taking analgesics as compared to 45% and 36% from the Control Group, respectively. All extraction wounds healed by first intention, except one from the Control Group showing healing by secondary intention. Sixty seven per cent of the children from Calendula Group and 32% from the Control Group showed approximation of tissue edges by third post-operative day. This difference was found to be statistically significant (Chi square: 8.51,  $p = 0.014$ ).

**Conclusions:** Topical application of Calendula tincture caused significantly faster healing after extraction. Also, application of Calendula tincture caused less post-operative pain in children.

**Key Words:** Keywords: Calendula, Healing, Extraction wounds, Children

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### Introduction:

Calendula, commonly known as Marigold, has been successfully used over the years as a remarkable healing agent by practitioners of homeopathy. Various studies on humans have reported the use of calendula based ointment for enhancing wound healing<sup>1-3</sup>. Calendula has been used in treating various inflammatory conditions of skin and mucous membranes<sup>4,6</sup>. Calendula extracts have been found to improve healing of surgical wounds in rats<sup>7</sup>. Recently, the intraoral use of Calendula officinalis established it to have antimicrobial activity against periodontopathogenic bacteria<sup>8</sup>. Calendula mouthwashes and toothpastes have demonstrated the efficacy of this plant in the reduction of gingival

bleeding thereby improving the overall oral hygiene status<sup>9,10</sup>.

The use of Calendula tincture has been recommended in the literature as a hemostat after dental extractions<sup>11</sup>. However, lack of literature on a controlled study evaluating Calendula on healing of intraoral wounds in children led to this study.

The purpose of this study was to evaluate the effect of topical application of calendula tincture (7:3 dilution) on healing of extraction wounds in children.

**Materials and Methods:** A total of 58 children who required extractions of primary teeth were selected. Informed consents were obtained from the parents after explaining them regarding the purpose and the nature of

the study. The selected children were randomly divided into 2 groups with 27

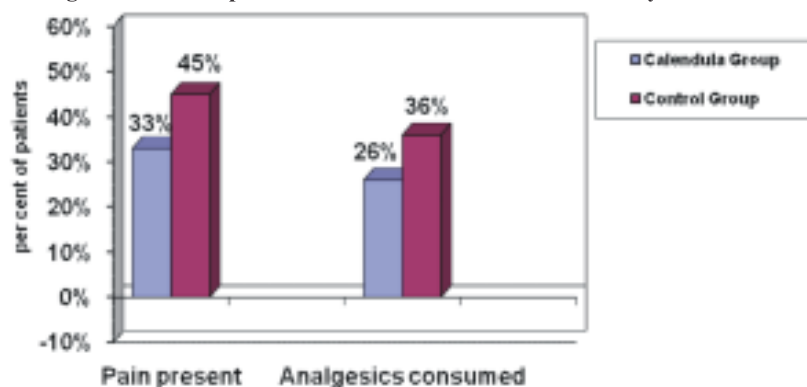
the extraction of the teeth no other hemostatic agent was used. The extraction sockets were compressed with pressure by hand. In Group 1 (Calendula) a cotton pack with few drops of calendula tincture (7:3 dilution in normal saline) was placed on the socket. In Group 2 (Control), a cotton pack with few drops of normal saline was placed on the socket. Children were asked to bite on the cotton pack for 30 minutes. Other post extraction instructions were also given. The children were evaluated on 3rd, 7th and 10th day post-operatively.

**Table 1. Distribution of sample size according to age and sex**

|        | Calendula group | Control group | Chi square | p    |
|--------|-----------------|---------------|------------|------|
| Age    |                 |               | 2.96       | 0.40 |
| 9 yrs  | 8               | 12            |            |      |
| 10 yrs | 12              | 16            |            |      |
| 11 yrs | 7               | 3             |            |      |
| Sex    |                 |               | 0.84       | 0.36 |
| Male   | 9               | 14            |            |      |
| Female | 18              | 17            |            |      |

children in Group 1(Calendula) and 31 children in Group 2 considered as control

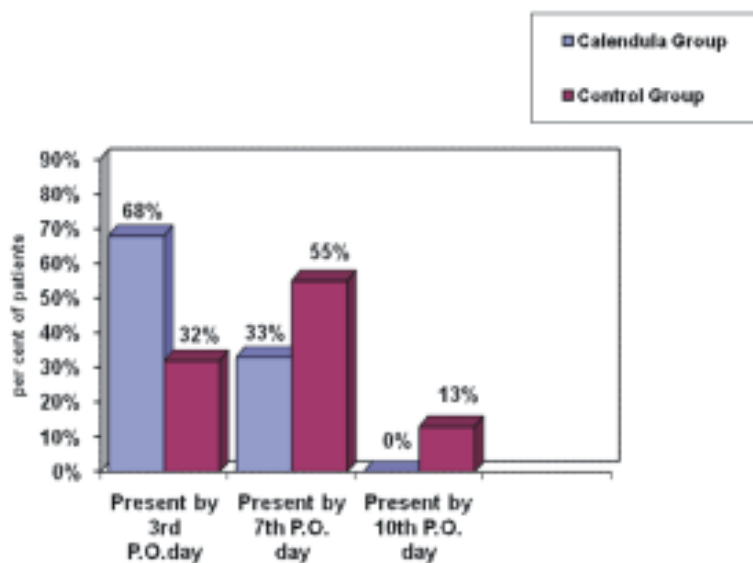
**Fig.1: Effect of Topical Use of Calendula on Pain on the Day of Extraction**



group(Table 1). Extractions were performed under local anaesthesia and after

operative pain, whereas only 33% from the Calendula Group had post-operative pain (Fig.1). Percentage of children who took analgesic post-operatively was found to be 26% for Calendula Group and 36% for the Control Group (Fig.1). There was no associated swelling, food lodgment, bleeding or discomfort on eating in both the groups. All extraction wounds from the Calendula Group healed by first intention whereas, one extraction wound from the Control Group showed healing by secondary intention. Approximation of tissue edges was found by third post-operative day in 67% children in the Calendula Group and only 32% in the Control Group. Most of the extraction wounds in the Control Group showed healing by 7th post-

**Fig.2: Effect of Topical Use of Calendula on Approximation of Tissue Edges**



operative day (55%) as compared to 33% in the Calendula Group, whereas only 13% children in Control Group showed healing by 10th post-operative day (Fig.2). This difference was found to be statistically significant (Chi-square: 8.51,  $p=0.014$ ).

**Discussion:** Review of literature reveals that more than 80% of the world's population depends upon traditional medicines for various skin diseases<sup>13</sup>. Calendula, an annual plant of the family Asteraceae, has been used medicinally since the 12th century. Bright golden yellow Calendula flowers were made into extracts, and used both topically as well as internally to help heal wounds.

Plant metabolites play a vital role in wound healing<sup>14,15</sup>. There has been a long tradition and numerous case reports of using Calendula based ointments for wound healing and hemorrhoids<sup>1,3,6</sup>. In patients suffering from leprosy, an ointment containing 10% calendula extract healed chronic skin sores and prevented additional infections<sup>2</sup>.

Calendula has been reported to improve healing of surgical wounds<sup>7</sup>. Histological studies of wounds have shown extracts of calendula stimulates the regeneration and epithelization by promoting intensive metabolism of glycoproteins, nucleoproteins and collagen proteins during regenerative period in the tissue thereby accelerating healing of surgical wounds in rats<sup>16</sup>. These findings coincides with the findings of this study where approximation of tissue edges was found by third post-operative day in most of the children in calendula Group (67%).

Calendula possesses high topical anti-inflammatory activity similar to that of prostaglandin inhibitors<sup>17</sup> due to the presence of saponins and flavonoids in its phytochemical composition<sup>18</sup>. Topical application of calendula extracts have reported to reduce pain and swelling in bruises, cuts and in cases with bee stings<sup>19</sup>. In the present study, the post-operative pain in the Calendula Group was less (33%) than the Control Group (45%). This finding is also in accordance with the study wherein the reported use of Calendula ear drops decreased the pain and inflammation in children having otitis

media<sup>20,21</sup>.

It is established that the use of oral antiseptics after intraoral surgery is an efficient method for microbial reduction and the consequent prevention of infections<sup>16</sup>. In a post-extraction study conducted on adults, antiseptics with mouthwash containing Calendula officinalis has showed a tendency for reducing the number of microorganisms adhered to suture materials after extraction of unerupted third molars when sutures were evaluated at the time of removal on the seventh postoperative day thereby stressing on its antimicrobial property<sup>22</sup>. Post-operative complications observed with tooth extraction in children have been reported in literature as delayed wound healing, local wound infection, persistent bleeding, or persistent pain<sup>23,24</sup>. In the present study, the effect of topical application of Calendula (7:3 dilution) on healing of extraction wounds in children was evaluated. After assessing various parameters used for evaluating healing, it was concluded that Calendula enhances healing of extraction wounds in children. This finding is in accordance with other published reports which indicate that Calendula promotes wound healing and possesses both antibacterial and anti-inflammatory properties<sup>17,22,25-27</sup>.

Calendula has already been used systemically for treatment of gastroduodenitis and duodenal ulcers<sup>28</sup>. Both topical and systemic use of calendula based homeopathic medication has reported to significantly reduce the severity and duration of chemotherapy induced stomatitis in children undergoing bone marrow transplantation<sup>29</sup>. No reports of potentially suspected drug interactions related to Calendula have been made in the literature<sup>30</sup>.

**Conclusion:** Use of plants for intraoral wound healing is one of the developing areas in modern biomedical sciences. It is concluded from the present study that the topical application of Calendula tincture (7:3 dilution) has beneficial effect on healing of extraction wounds in children as it leads to speedy and uneventful healing. However, further research on this subject should be encouraged.

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