WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 23, 1522-1532. Research Article ISSN 2277–7105

CLINICAL STUDY OF EXTERNAL APPLICATION OF EMBLICA OFFICINALIS FOR THE EASY ERUPTION OF TEETH IN INFANTS

Dr. Rutuja Nogja*[1] and Dr. Rahul H. Gujarathi[2]

[1]MD Resident, Department of Kaumarbhritya, College of Ayurveda, Bharati Vidyapeeth (Deemed to be University), Pune, Maharashtra, India.

[2]Guide, HOD and Professor, Department of Kaumarbhritya, College of Ayurveda, Bharati Vidyapeeth (Deemed to be University), Pune, Maharashtra, India.

Article Received on
21 Oct. 2024,

Revised on 11 Nov. 2024,
Accepted on 01 Dec. 2024

DOI: 10.20959/wjpr202423-35032

***Corresponding Author**
Dr. Rutuja Nogja
MD Resident, Department of Kaumarbhritya, College of Ayurveda, Bharati Vidyapeeth (Deemed to be University), Pune, Maharashtra, India.

ABSTRACT

Background: *Ayurveda*, the two fundamental objectives of illness prevention and treatment are highly stressed in *Charak Samhita. Ayurveda* acknowledges the significance of dental care and the close relationship between overall health and oral health. Numerous research and publications from different nations have reported that 70.5% of infants have indications and symptoms during the eruption of their first tooth. Children in the age group of five months and older at the time of teeth eruption have a high incidence of morbidity status. Easy eruption of teeth (*Sukhapurvak Dantodbhed)* is scheduled for investigation. The effectiveness of Emblica officinalis *(Dhatriphala Churna)* in facilitating a baby's easy teeth eruption is being studied. **Methodology:** A randomized open trial was carried out with informed permission to assess the effectiveness of the external application of Emblica officinalis (*Pratisaran of Dhatriphala Churna*) in facilitating easy eruption and preventing morbidities during tooth eruption. A total of 35 patients who routinely visited the outpatient department for checkups were randomly enrolled in the trial. The parameters were evaluated once every 15 days for the first three months, then once every month for the final three months, for six months. The children were evaluated based on the study's specific parameters. **Conclusion:** Teething is a difficult and distressing procedure for infants. Most clinical signs occurred during lower central incisor tooth eruption, and they decreased with subsequent eruption, according to the study, which established a connection between diseases and primary tooth eruption. External application of

Emblica officinalis (*Pratisaran of Dhatriphala Churna*) helped during dentition to ease the eruption; in later phases, its effectiveness improved by more than 50%. Emblica officinalis promotes tissue regeneration, strengthens bone tissue (*Asthi Dhatu)*, removes debris, improves blood circulation, and stimulates gum healing through the *Pratisaran* procedure, a mild mechanical rubbing action. **Result:** The study's findings indicate that Emblica officinalis (*Dhatriphala Churna)* can help easy eruption with less difficulty and prevent diseases during dentition.

KEYWORDS: *Ayurveda, Dentition, Teeth, Dhatriphala Churna, Pratisaran.*

INTRODUCTION

According to *Charaka Samhita*, also referred to as the science of life, Ayurveda strongly emphasizes two main goals: illness prevention and treatment.[1] *Ayurveda* recognizes the importance of dental care and the strong correlation between oral health and general well-being. Eruption derived from the Latin word “erumpere’, meaning “to break out” is a part of the complex process of tooth movement within growing jaws to maintain their position and compensate for wear.[2] Children in the age group of five months and older at the time of teeth eruption have a high incidence of morbidity status.[3]

Kashyapa Samhita describes the various and intricate facets of dentistry. Teeth are seen by *Aacharya Kashyapa* as a sign of overall wellness. The total number of teeth is 32, out of 35, 20 are deciduous teeth and permanent teeth are 32. Deciduous teeth do not include premolars and third molars, Permanent teeth include all types of teeth, including premolars and third molars.[4] Classics have accepted the number of teeth and their sockets as thirty-two.[5–7]

Table no. 1: Chronology of Human Dentition.[8]

	Hard tissue formation begins (weeks in utero)	Enamel completed (months after birth)	Eruption (months)	Root completed (years)
MAXILLARY				
Central incisor	14	1 ½	10 (8-12)	1 ½
Lateral incisor	16	2 ½	11(9-13)	2
Canine	17	9	19 (16-22)	3 ½
First molar	15 ½	6	16 (13-19 boys) (14-18 girls)	2 ½
Second molar	19	11	29 (25-33)	3
MANDIBULAR				
Central incisor	14	2 ½	8 (6-10)	1 ½
Lateral incisor	16	3	13(10-16)	1 ½

Canine	17	9	20(17-23)	3 ¼
First molar	15 ½	5 ½	16(14-18)	2 ¼
Second molar	18	10	27 (23-31 boys) (24- 30 girls)	3

As per Ayurveda, Teeth *(Danta)* are *Updhatu* (a by-product of) *Asthi*, it has a predominance of *Prithvi* (earth element) *and Vayu* (air element) *Mahabhuta*. The word *Ruchakasthi* describes a specific type of bone called Teeth *(Dantas)*. Humans inherit their teeth from their fathers and grow them after birth. these teeth get inseminated around four months of life.[9–14] Teeth eruption is caused by Bone and bone marrow. Since the regrowth of veins that supply blood to the teeth's socket is thought to have an impact on the appearance of teeth that have fallen accidentally, the involvement of blood in tooth eruption has been accepted.[15] As per *Aacharya Charaka*, there is a greater tendency for teeth to fall out when there is osteoporosis (*Asthi Kshaya).*[16] Race, environment, and maternal/paternal factors influence an entity's genesis, growth, development, and fall, with genetic and environmental factors potentially disrupting normal synthesis. Teeth appear earlier in girls than boys, creating less trouble because of the soft gums and porous teeth.[17]

Infants find the teething process challenging and upsetting. *Aacharya Vagbhata* described the discomfort of the ailment, comparing it to damage to a cat's spinal vertebrae or a peacock's emerging crown.[18] Also described various diseases during teeth eruption as Fever *(Jwar),* Headache *(Sirorooja),* Thirst *(Trishna),* Giddiness *(Bhrama),* Ophthalmia *(Abhishyanda),* Stye *(Pothaki),* Vomiting *(Chhardi),* Cough *(Kasa),* Dyspnea *(Shwasa),* Diarrhoea *(Atisara),* Herpes *(Visarpa)* etc. are mentioned in Ayurveda.[19,20]

Aacharya Vagbhata, *Yogratnakar, Bhaisajyaratnavali,* and *Vangasen* mentioned herbs as well as various formulations e.g., single-drug therapy, etc. described in *Samhita* for an easy and painless eruption of teeth.[21–26] In modern dentistry, various measures like topical agents and systemic analgesics are useful in dentition but give only symptomatic relief. The drug formulation selected for the present study is a powder of Emblica officinalis having *Amla, Kashaya, Madhura, Tikta, Katu* dominant *Rasa,* and *Tridoshaghna* Properties. It helps to prevent morbidities of diseases during dentition.

MATERIALS AND METHODS

Plan of study

1. Clinical and therapeutic study of Emblica officinalis on dentition

2. Discussion
3. Summary and conclusion SOURCE OF DATA

Infants in the pre-dentition age group with no signs or symptoms of pre-dental eruption were selected from the Dept of Balroga B.V.D.U. College of Ayurveda and Hospital, Pune.

Selection of the cases

- Patients not showing pre-dental eruption signs during regular checkups at OPD of Bharati Vidyapeeth (Deemed to be University) College of Ayurved and Hospital were enrolled in the trial.
- Questions were asked to the parents/ caretaker and the details of the history were noted in case information proforma.
- Open assent is taken from each parent/caretaker.

INCLUSION CRITERIA

1. Infants in the age group of 6 to 12 months with no signs and symptoms of tooth eruption.
2. Full-term infants.

EXCLUSION CRITERIA

1. Preterm infants
2. Infants with genetic disorders (based on newborn metabolic screening)
3. Infants with anatomical/ congenital anomalies related to GIT.
4. Suspicion of any syndromic phenotype like Down's syndrome etc.
5. Infants with bleeding disorder if any, previously diagnosed.

STUDY DESIGN

The single-arm open interventional clinical study is a type of in Bharati Ayurved Hospital Pune with a 6-month duration. The total number of patients selected for this study is 39. Some withdrawals are seen before and after giving treatment. In this study, a total of four patients dropped out while it was being conducted. The case selection is based on the prevalence of infants who come under the age group of 6 to 12 months, attending the OPD of Bharati Ayurved Hospital. we picked the age group of 6 to 12 months because this is when the dentition period begins.

Drug- Powder of Emblica officinalis *(Dhatriphala Churna).*

Dose- 60 mg of powder of Emblica officinalis is mixed with pasteurized Honey.

Route of Administration- external application over infant's gum *(Pratisaran).* **Duration**- The study is carried out for 6 months.

Kala/ frequency- thrice a day.

Follow-up is taken on every 15th day for the first 3 months and monthly for the next 3 months (i.e. 15th, 30th,45th, 60th,75th, 90th, 120th, 150th,180th day). Several follow-ups about 2-3 have been conducted over the telephone because the study period is quite long. Powder of Emblica officinalis has been prepared by a standard method as per the API guidelines by a GMP-certified pharmacy. On the day of enrollment, the parent of an infant was demonstrated and guided in the procedure of external application of powder of Emblica officinalis with honey for 15-20 sec and counseled and asked to follow the same procedure for 6 months. The age/time of tooth eruption was noted in the case record proforma.

ASSESSMENT CRITERIA

Assessment of the incidence of diseases at the time of tooth eruption has been done based on objective and subjective parameters on every follow-up till the completion of the study.

Subjective Parameters	Objective Parameters
Cough *(Kasa)*	Fever *(Jwara)*
Conjunctivitis *(Netra Abhishyanda)*	Diarrhea *(Atisara)*
Skin lesions *(Visphota)*	Vomiting *(Chhardi)*

STATISTICAL ANALYSIS

The statistical methods for this study included the mean-median, f-test, regression methodology, and Karl Pearson's test.

OBSERVATION AND RESULTS

In this study, the maximum no of children (out of 35) were males (54%) and the maximum number of children belonged to a middle-class family. 63.15% of male children suffered from diseases at the time of tooth eruption, compared to 56% of females. It was observed that the incidence of diseases during teeth eruption is lower in females compared to males. It was reported that teething disturbances occur in as many as 60% of children with erupting teeth experienced general systemic diseases such as fever, diarrhea, and vomiting, while 40% showed no symptoms in the study population. In this study, the mean ages for the lower central incisor, upper central incisor, upper central incisor, and lower lateral incisor are 9.3,

10.3, 11.7, and 12.75 months, respectively which is similar to the Chronology of human dentition mentioned in pedodontics.

Incidences during tooth eruption- as per the study analysis, 48.6% of children had diarrhea, and 45.7% had vomiting during the eruption of the lower central incisor, 28.6% of children had vomiting and 34.3% of children experienced diarrhea during the eruption of the upper central incisor. With the eruption of the upper lateral incisor, vomiting occurred in 20% of instances and diarrhea occurred in 11.4% of cases. Cough, diarrhea, and fever were the most common illnesses seen in children during the eruption of the lower central incisor. This research revealed a downward trend in the percentage of patients experiencing illnesses with tooth eruption. 54.3%, 45.7%, and 28.6% of children were sick at the time of eruption of the lower central incisor, upper central incisor, and upper lateral incisor respectively and it fell to 14.3% at the time of eruption of the lower lateral incisor. In this study conjunctivitis and skin lesions were not found in a single child out of 35 children.

The age–weight relationship is not impacted in this study, according to Karl Pearson's test correlation coefficient at the time of tooth eruption between age and weight, which is significant at the 1% and 5% levels of significance (P Value is 0.001). regression analysis was used to estimate the relationship between age and weight. The following observations show the mean weight of the baby at different ages.

Eruption of teeth	Average age	Mean of weight	Expected weight (as per IAP chart)
Lower Central Incisor	9.3 months	7.95 kg	8.8 kg
Upper Central Incisor	10.3 months	8.22 kg	9.05 kg
Upper Lateral Incisor	11.7 months	8.59kg	9.25 kg
Lower Lateral Incisor	12.75 months	8.87 kg	9.55 kg

The chart calculates the average / expected weight for girls and boys at the 50th percentile.

Drug effectivity- the reduced number of patients facing diseases during teeth eruption is the key indicator that Emblica officinalis is effective. From the statistical analysis, it concluded that as we use the drug Emblica officinalis is effective for at least 50% of patients in the teeth eruption process in the Lower central incisor and effective for more than 50% of patients in the teeth eruption process in the Lower Lateral incisor and Upper Lateral incisor time.

DISCUSSION

One of a baby's most treasured developmental milestones is the emergence of their first tooth. *Dantajanmika Adhyaya* is a particular chapter in the *Kashyapa Samhita* that highlights potential challenges during tooth eruption while discussing dentition-related topics. *Aacharya Vagbhata* and *Aacharya Kashyapa* described the eruption and shedding of primary teeth as well as the eruption of permanent teeth at the time as comparable to current dentistry. Race, environment, and maternal-paternal factors are some of the variables that influence the genesis, eruption, growth, development, and fall of any entity, as well as its strengths and weaknesses. The concept of *Aacharya Vagbhata* regarding the genesis of teeth is more precise to current science. He opines that Dhatubeeja is responsible for the further development of teeth. Although teeth develop continuously, there are three main stages the bud, cap, and bell stages which coincide with the onset of mineralization and root creation. three phases- the pre- eruptive, eruptive, and post-eruptive phases- can be distinguished in the movements leading up to tooth eruption. When *Asthi* and *Majja* undergo ripening, slight swelling occurs after getting localized in gums, and due to rubbing of upper and lower gums, horripilation and itching occur. Aggravated *Vata* localized in roots of teeth, accompanied by *Kapha* and moves with *Pitta Dosha*, vitiates *Dhatu* and it causes secondary diseases during teeth eruption such as Fever *(Jwar),* Headache *(Sirorooja),* Thirst *(Trishna),* Giddiness *(Bhrama),* Ophthalmia *(Abhishyanda),* Stye *(Pothaki),* Vomiting *(Chhardi),* Cough *(Kasa),* Dyspnea *(Shwasa),* Diarrhoea *(Atisara),* Herpes *(Visarpa),* etc. which are nearly the same as the signs and symptoms mentioned in pedodontics pain, inflammation of mucous membrane, malaise, circumoral rashes, bowel upset (loose stools), alteration in volume of fluid intake, increased body temperature. *Aacharya Vagbhata*, *Yogratnakar*, and *Vangasen* mentioned herbs as well as a formulation e.g. single drug therapy, *Ghritapana*, *Mamsarasasevana*, etc. described in Samhita for an easy and painless eruption of teeth. In modern dentistry, various measures like topical agents and systemic analgesics are useful in dentition but give only symptomatic relief. The drug formulation selected for the present study is Powder of Emblica Officinalis *(Dhatriphala Churna)* having *Amla, Kashaya, Madhura, Tikta, Katu* dominant *Rasa* and *Tridoshaghna* properties. Emblica officinalis is effective in the treatment of conjunctivitis etc. eye disorders as it is also called *Chakshyushya* in Ayurveda. E. officinalis fruit contains tannins as its main component having a high potential for treating intestinal disorders such as diarrhea and dysentery. Due to its antiemetic properties and *Deepan-Ruchya* properties, it helps to prevent episodes of vomiting. Emblica officinalis also possesses antimicrobial activities along with antipyretic and analgesic effects. It confers

immunity due to its immunomodulatory function, which is mediated by ascorbic acid. Additionally, it aids in the production of collagen, a crucial protein that supports, maintains, and gives teeth shape. Deposition and mineralization of calcium induced by vitamin C. Honey which is used with Drug formulation in this study plays an important role. It helps to eliminate disease-causing agents from the body, promoting detoxification and accelerating the bioavailability of the main drug. We pick the age bracket of 6 to 12 months because this is when the dentition period begins. The exact dose of Emblica officinalis for external application is not found in any literature therefore dose of the drug has been decided by an expert Ayurvedic practitioner. Even though the trial period was extended to six months so that we could thoroughly evaluate the diseases during tooth eruption, during this time we were also able to evaluate the drug's efficacy and the occurrence of diseases at various tooth eruption points. Several follow-ups, about 2-3, have been conducted over the telephone because the study duration is quite long. It is not always possible for the patient to visit the OPD for follow-up within 15 days or months due to distance or other circumstances. We try to measure all parameters as possible as we measure the temperature for fever criteria and episodes of loose motions for checking the diarrhea criteria and also measure the episodes of vomiting mothers may express complaints in this way, information can also be obtained over the phone. Conjunctivitis is considered a subjective parameter since there is no evaluation parameter for measuring redness, just as there is no way to quantify skin lesions. As per the data, there is a 700-800 gm discrepancy between individual's actual weight and their expected weight at a given age but there could be several reasons for this discrepancy taking into account weight margin, and some follow-ups were conducted via telephone (at that time we were unable to record the weight). A total of 4 patients out of 39 dropped out from the study reasons are- 1. Parents of registered infants refused to perform the procedure regularly.

2. No physical follow-up. 3. Application of drug missed for 10 consecutive days. The sequence of tooth eruption is the same as described in the text found in this study. First – lower central incisor then second upper central incisor then third Upper lateral incisor and fourth – lower lateral incisor. According to the study, tooth eruption has the greatest impact on the lower central incisor, the least amount of effect is visible at the lower lateral incisor stage. Additionally, this is observed almost simultaneously with the onset of primary tooth eruption, when newborns lose the mother's antibodies that protect them from infections. This increases the baby's susceptibility to infections, which might result in fever, diarrhea, vomiting, and other symptoms. Symptoms occurring during eruption could appear alone or in combination.

The removal of debris, irritated granulation tissue and bacterial colonies is accomplished by mechanical pressure. Additionally, blood circulation is improved and the healing and regeneration of gums are stimulated by the mild mechanical rubbing action of the external application of Emblica officinalis *(Pratisaran of Dhatriphala Churna).* This study shows that the efficacy of powder of Emblica officinalis is up to 50% in the initial stage and in the lateral stage it goes to more than 50% also shows that weight loss is well prevented, prevents diseases during teeth eruption in children and helps for easy eruption of teeth. Along with powder of Emblica officinalis oral hygiene, good nutrition, and immunity play an important role in teeth eruption.

CONCLUSION

Dentition is a Physiological process, initiated from late infancy and completed by the second decade of life. The process of dental eruption has been in detail explained in both Ayurved and Modern medical science. The difference in the number of deciduous teeth in Ayurved and Modern medicine is more likely because of the overlapping period of shedding of deciduous teeth and the eruption of permanent teeth. A dentition is considered to be the root cause of various diseases arising during the dentitional period. The process of dental eruption is quite painful. Respiratory and GI diseases are more common than other diseases that have been mentioned in Ayurvedic literature. Vitiation of *Doshas* which occurs during dentition, is considered to be a causative factor for this disease. Ayurveda has a preventive approach against this disease occurrence. Dentition is a painful process and external application (*Pratisaran)* of the herbal drug can up to a certain extent ease this process, thus reducing it. Emblica officinalis (*Dhatri)* is rich in vitamin C which is responsible for collagen synthesis which in turn is essential for tissue healing, and healing of the gums; the gums being more cartilaginous in this age. The *Rasayan* property of Emblica officinalis (*Dhatri)* aids in faster recovery from this disease by pacifying the vitiated *Tridosha*. Being a *Rasayan*, Emblica officinalis (*Dhatri)* reduces inflammation (*Shotha)*, which in turn reduces the discomfort or pain of dental eruption. The mean age, in today's era, for dental eruption still follows the dental eruption window period and also follows the sequence of eruption.

REFERENCES

1. Agnivesa. Charaka Samhita. In: Joshi Y. G., editor., Sutrasthana, Arthedashmahamuliya Adhyay, 30/26. 7th ed. Pune: M. Vaidyamitra Prakashan, 2019; 1: 412.
2. Marwah Nikhil. Textbook of Pediatric Dentistry. In: Chapter 14, Tooth eruption and

Shedding . 4th ed. New Delhi: Jaypee Brothers Medical Publishers(P) Ltd., 2019; 141.

3. Vagbhat. Astanga Hridaya. In: Murthy Srikantha K.R., editor., Uttarasthan, Balamaya Pratisedha Adhyay, 2/26. 8th ed. Varanasi: Chowkhambha Krishnadas Academy, 2015; 3: 17.
4. Agrawal Mukesh. Textbook of Pediatrics. In: Chapter 2nd, Normal Growth and Development. 2nd ed. New Delhi: CBS Publishers, 2017; 9.
5. Agnivesa. Charak Samhita. In: Dr. Sharma R.K., editor., Sharirasthan, Sharirsankhya sarira Adhyay, 7/6. Reprint. Varanasi: Chaukhamba Sanskrit Series, 2017; 2: 453.
6. Sushruta. Sushruta Samhita . In: Sharma P.V., editor., Sharirsthana, 5/26. Reprint. Varanasi: Chaukhambha Visvabharati, 2013; 2: 176.
7. Vagbhat. Astang Samgraha. In: Murthy Srikantha K.R., editor., Sharirsthan, Angavibhag Sarir 5/46. Reprint. Varanasi: Chaukhamba Orientalia, 2016; 2: 69.
8. Marwah Nikhil. Textbook of Pediatric Dentistry. In: Chapter 14, Tooth Eruption and Shedding. 4th ed. New Delhi: Jaypee Brothers Medical Publishers, 2019; 147–8.
9. Sharangdhar. Sharangadhara Samhita. In: Parashar Shriradhakrishna, editor. Pratham Khanda, 5/ Verse 13. 3rd ed. Nagpur: Shri Baidyanath Ayurved Bhavan Ltd., 1984; 31.
10. Vagbhat. Astang Samgraha. In: Murthy Shrikantha K.R., editor., Sharirsthana, Angavibhaga Sarira Adhyay, 5/65. Reprint. Varanasi: Chaukhamba Orientalia, 2016; 2: 75.
11. Agnivesa. Charak Samhita. In: Dr. Sharma R.K., editor., Sharirsthana, Garbhavkranti Sarir Adhyay, 4/14. Reprint. Varanasi: Chowkhamba Sanskrit Series office, 2017; 2: 393.
12. Sushruta. Sushruta Samhita. In: Sharma P.V., editor., Sharirsthana, 5/20. Reprint. Varanasi: Chaukhambha Visvabharati, 2013; 2: 175.
13. Agnivesa. Charaka Samhita. In: Sharma R.K., editor., Sharirsthana, Khuddika Garbhavkrantisarira , 3/7. Reprint. Varanasi: Chowkhamba Sanskrit Series Office, 2017; 2: 371.
14. Sushruta. Sushruta Samhita. In: Sharma P.V., editor., Sharirsthana, 5/33. Reprint. Varanasi: Chaukhamba Visvabharati, 2013; 2: 148.
15. Vagbhat. Astang Samgraha. In: Murthy Srikantha K.R., editor., Uttarsthana, Balamaya Pratisedha Adhyay, 2/21-22. Reprint. Varanasi: Chaukhambha Orientalia, 2012; 3: 21.
16. Agnivesa. Charaka Samhita . In: Dr. Sharma R.K., editor., Sutrasthana, 17/67. Reprint. Varanasi: Chowkhamba Sanskrit Series Office., 2019; 1: 324–5.
17. Dr. Singh Brij Mohan. Textbook of Balroga Kaumarbhritya. In: Chapter 15, Dantotpatti avam Danta Rakshavidhi. 1st ed. Varanasi: Chaukhambha Orientalia, 2015; 503.

18. Vagbhat. Astang Hriday. In: Murthy Srikantha K.R., editor., Uttarsthan, Balamay Pratisedha Adhyay, 2/28. 8th ed. Varanasi: Chowkhamba Krishandas Academy, 2015; 3: 17.
19. Vagbhat. Astang Hridaya. In: Murthy Srikantha K.R., editor., Uttarsthana, Balamayapratisedha Adhayay, 2/26-27. 8th ed. Varanasi: Chawkhamba Krishnadas Academy, 2015; 3: 17–8.
20. Vagbhat. Astang Sangraha. In: Murthy Srikantha K.R., editor., Uttarsthana, Balamaya Pratisedha Adhyay, 2/19. Reprint. Varanasi: Chawkhambha Orientalia, 2012; 3: 20–1.
21. Vagbhat. Astanga Sangraha . In: Murthy Srikantha K.R., editor., Uttarsthana, Balamaya Pratisedha Adhyaya, 2/33-35. Reprint. Varanasi: Chaukhambha Orientalia, 2012; 3: 23.
22. Vagbhat. Astang Samgraha. In: Murthy Srikantha K.R., editor., Uttarsthana, Balamaya Pratisedha Adhyaya, 2/59-60. Reprint. Varanasi: Chaukhambha Orientalia, 2012; 3: 26.
23. Vagbhata. Astang Hriday. In: Murthy Srikantha K.R., editor., Uttarsthan, Balamaya Pratisedha Adhyay 2/35-37, 41-42. 8th ed. Varanasi: Chawkhambha Krishnadas Academy, 2015; 3: 19–20.
24. Yogaratnkar. Yogaratnakar. In: Shastri Laxmipati, editor. Vidyotini, Uttarardha, Balrogaadhikara, Dantbhedajrogeshu, verse 1. Reprint. Varanasi: Chauwkhambha Sanskrit Series office, 2011; 882.
25. Vangasen. Vangasen Samhita. In: Vaishya Shaligramji, editor. Balrogaadhikara, Dantaroga Chikitsa, 19/137-138. Reprint. Mumbai: Khemraj Shrikrushna Das Prakashan, 2003; 869.
26. Dasji Shri Govinda. Bhaisajyaratnavali. In: Mishra Brahmashankar, editor., Balroga Chikitsa 71/123-126. 1st ed. Varanasi: Chaukhambha Sanskrit Bhawan, 2006; 3: 446.