

## Designing a Picture Book Entitled "Dana and Dentistry"

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### Abstract

**Background:** Children's knowledge of dental science is important for their oral health. Picture books can aid teaching scientific and practical concepts to children with the use of easy-to-understand pictures. The aim of the present study was to determine an appropriate topic for each chapter of the book and design the pictures in a suitable manner for 3 to 6 year old children.

**Materials and Methods:** In this cross-sectional study, the subject of each chapter was selected by a pediatric dentist and two pediatric dental residents. The selected subjects were explained to the painter with the help of pictures from reference books. The designed images were, then, modified during the 6 months of weekly meetings in Kerman Dental School; and in case of more than 90% agreement between the two residents, the images were reviewed by a pediatric dentist and then the final approval was obtained.

**Results:** The topics of the present picture book are consistent with pediatric dentistry text books. The book was designed in 18 chapters including 131 schematic images. The pictures in each chapter are based on a particular topic relevant to pediatric dentistry. Each chapter consists of 3-15 images. Harmony in the chosen colors and the image continuity were positive aspects, achieved through the close cooperation between the pedodontists and the illustrator.

**Conclusion:** In this research, a book was designed that tries to answer the common questions of parents about pediatric dentistry and teaches the scientific topics of pediatric dentistry to children in the form of schematic and storytelling images.

**Key Words:** Pediatric dentistry, Picture book, Preschool children.

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## 1- INTRODUCTION

During the past 40 years many wordless picture books have been published for children (1). Wordless picture books, also known as silent books, are considered to be a unique genre of text as they rely solely on illustrations to convey the considered concept (2). This may be particularly suitable for the preschool children who are not so familiar with words, while they have a powerful sense of vision orientation which naturally attracts them to wordless picture books (3). The fact that it has been recommended to use illustrations on each page of children's books up to 6 years of age, further points out the importance of visual learning in children (4). It is more fun for children to develop their own understanding of pictures creatively and based on their rich imagination (5).

Wordless picture books aid in connecting visual literature, social literature and print literature (words)(6). They also play an important role in the development of vocabulary and linguistic skills. They inspire creative thinking and enhance the sense of achievement and self-expression in children (2). Regarding the topics of picture books, a variety of issues have been addressed, ranging from philosophical issues such as death, war and conflict, loneliness to routine daily issues in the society(7).

However to our knowledge and based on the review of literature very few picture books have been published to address oral health issues and most of them incorporated text in their books to some extent. Moreover the effect of visual support was mostly assessed in children with some kind of health issues such as autism or hearing loss. The effectiveness of pictorial stories in the acceptance of dental procedures by children is stated in a few studies as mentioned below: Grazia Cagetti et al. carried out a study on 6-12-year-old children with autism spectrum

disorder, in which he emphasized the important role of visual support in accepting dental procedures, such as fissure sealants and restorative treatments (8). Another study was performed on 13-to-17-year-old children with an autism spectrum disorder. It revealed the improved acceptance rate of dental visits among children, when an understandable picture was shown before the dental procedure (9). Vafaie et al. revealed the significant decrease in pain perception and increased tolerance among 6-7-year-old children, for whom pictorial stories had been applicated during a dental appointment (10).

The storybooks designed around the dentistry subjects have talked more about the harms of eating sweets and candy; they, for example, explain that eating sugary foods cause decay or try to describe the importance of brushing; or they work on the issue of going to the dentist and treating worm-eaten teeth. The authors of these books are mostly professional writers, without expertise in the field of dentistry. Therefore, the existing storybooks only deal with the subject of nutrition of cariogenic foods and the importance of maintaining oral health. But in the book "Dana and Dentistry" the specialized topics of pediatric dentistry are designed by a group of designers consisting of pediatric dentists, dental students and a female pediatric painter in the form of schematic images. The book was designed, edited and then evaluated over a 3-year period. The first step was the specification of the book topics and number of chapters by the designing team, which are discussed in details in the current article; the next step was evaluating the success rate of designing this book to convey the scientific concepts of dentistry correctly to children and parents, the reports of which will be provided in subsequent articles.

Thus we decided to design a wordless picture book for a target group of healthy children aged 3 to 6 with the interaction of a dentist and a skilled illustrator of children's books in order to point out basic and practical issues of dentistry useful for this age group. Also this wordless picture book may be superior to other picture books, in that it is precisely designed according to the reference books of pediatric dental specialists; 1) McDonald and Avery's dentistry for the child and adolescent (tenth edition-2019) and 2) Pediatric Dentistry Infancy Through Adolescence (sixth edition- 2018)(11, 12).

## 2- MATERIALS AND METHODS

The protocol of the present experimental study was approved by the Ethics Committee of Kerman University of Medical Sciences under the code IR.KMU.REC.1395.950.

The number of chapters and number of pictures in each chapter was determined by a pediatric dentist, and attractive images were drawn based on pediatric dentistry reference textbooks after successive meetings with an illustrator. The book chapters were designed based on the questions commonly asked by parents or children about pediatric dentistry. The dentist, dental office, treatment stages, etc., were illustrated in order to reduce the child's fear of dental treatment stages by imitating the behavior of the cartoon character, Dana.

The design team of the book "Dana and Dentistry" has dealt with the main practical issues of pediatric dentistry. Each chapter of the book illustrates an important topic of dentistry correctly and according to the latest scientific references currently taught at the university. In order for the scientific content of the textbooks to be transmitted to preschool children, it was necessary for the images to be simple and in a story-telling manner. Images regarding

the following topics are displayed in this book: deciduous nerve treatment stages, age and order of deciduous and permanent teeth eruption, Necessary actions in case of dental traumas that have led to fracture of the crown or oval of the tooth, and deciduous tooth infections that can damage the underlying permanent tooth.

In terms of features, the book was illustrated, without writing and subtitles, and a fixed cartoon character "Dana" was present in all chapters in order to answer the questions raising in his mind as images.

The reason behind the creation of a "wise" childish personality is to make the specialized topics of dentistry more tangible for the child, so that the scientific principles of various treatments and oral diseases can be transmitted to the child in a childish language. Also, by drawing a painted magnifying glass, the areas inside the oral cavity were magnified.

## 3- RESULTS

The book "Dana and Dentistry" consists of 18 chapters. The illustrations are about pediatric dentistry for preschool children. Important and practical topics of pediatric dentistry were listed in this book. The number of images to convey each of these topics was identified. The designed book does not have a written section and the list of 18 mentioned chapters is also displayed in the form of images.

The first image in each chapter shows Dana thinking about the topic of that chapter. His thought is illustrated as thought bubbles arising from his mind. This was repeated for all chapters in order to convey a better understanding of the dental treatments. The opportunity provided for the child to color the stated thought bubbles would aid in attracting the child's attention to the concept of the drawings. **Table 1** shows the book specifications.

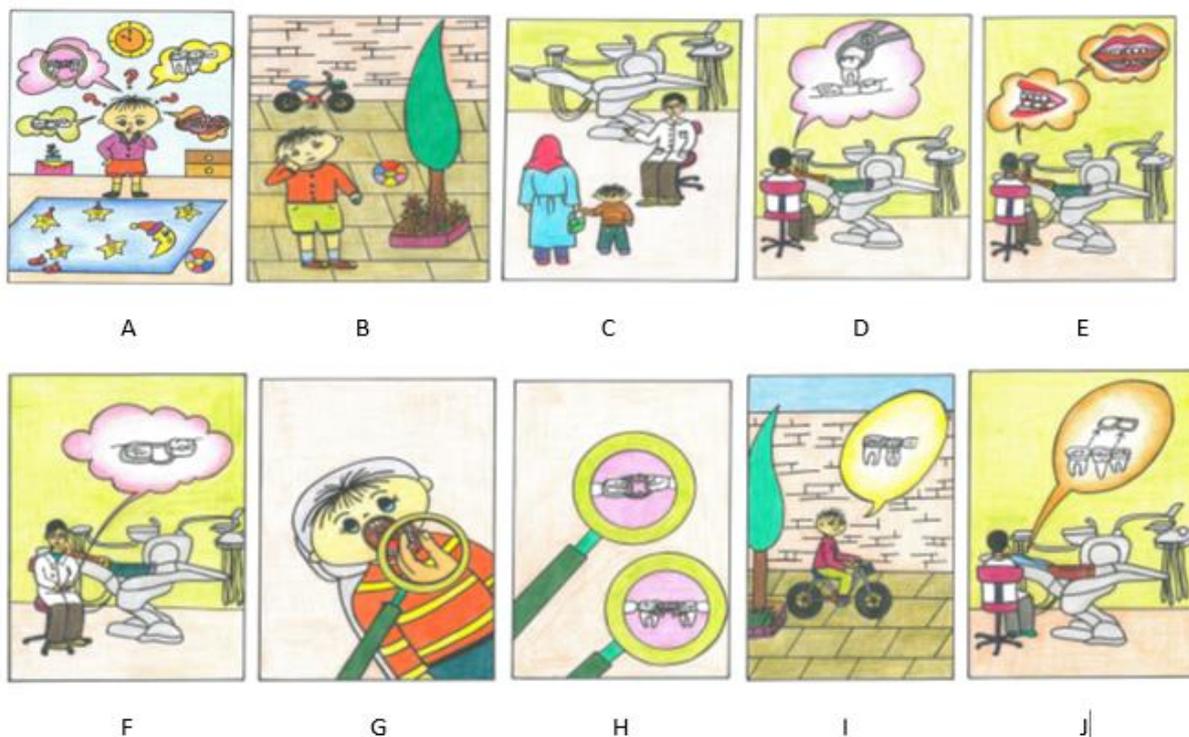
**Table-1:** The book chapters

Chapter	Topic (Each chapter deals with a common question of children about dentistry topics)	Goal (What do each chapter images introduce to the child?)	Number of images
1	What are the tooth parts?	The structure of enamel, dentin, pulp, crown pulp, and roots	3
2	What is the shape of the crown and roots of the teeth?	Number of roots, the difference between occlusal surface and incisal edge	5
3	Does a deciduous tooth have nerves?	The position of the permanent teeth bud, the independence of the pulp in permanent and deciduous teeth	7
4	Does a deciduous tooth denervation damage permanent teeth?	Stages of pulp treatment, pulp treatment and permanent teeth health, lack of pulp treatment, and damage to permanent teeth	6
5	What are the side effects of deciduous tooth extraction?	The importance of preserving deciduous teeth	7
6	What is a space-maintainer?	The shape and role of the space-maintainer, its ease-of-use for children	10
7	At what age do deciduous teeth grow?	The normal age range of tooth eruption	11
8	Are you aware of the growth of the first permanent molar?	Position, age of eruption and number, straight growth	5
9	Do you know the number of deciduous teeth?	diagnosis of dental anomalies and visiting the dentist	7
10	What to do when multiple rows of teeth are formed?	The normal position of two rows of mandibular front teeth wait for a spontaneous correction	9
11	What is the most proper way to brush your children's teeth?	How to brush properly?	15
12	Are you familiar with the fissure sealant technique?	Stages of fissure sealant treatment, its importance in caries prevention	7
13	At what age is fluoride mouthwash advised?	The importance of using fluoride mouthwash in the health of proximal surfaces	8
14	Do you know the cause of tooth decay?	Motivation for prevent tooth decay	5
15	Do iron drops cause black discoloration of teeth?	The solution to minimizing teeth discoloration	5
16	What to do if a tooth knocked out?	The importance of time to replant and see a dentist	10
17	What to do if a dental crown damaged?	The importance of time to see a dentist	6
18	Do you know when the best time for the first dentist visit is?	Time of the first dental visit	5

This table lists 18 chapters of the book, the number of images in each chapter and the purpose of designing each chapter. The choice of topics is mainly based on parents' concerns and in order to reduce the child's anxiety about dental clinics and offices. One of the questions parents commonly ask from dentists is: Does a baby tooth have nerves? Can treatment of the deciduous nerve damage the underlying permanent tooth bud? Can iron drops change the color of a child's teeth? At what age can a child gargle fluoride mouthwash? When should the child's first dental appointment be scheduled? And other questions of this kind that have been answered in the designed chapters of this book. For preschoolers, where kindergarten is the only space they have experienced outside of the family, dental environments are daunting. This anxiety increases when the dentist talks to their parents about the nerve treatment, tooth

extraction or fluoride therapy, etc., after examining the child's mouth and teeth. In this book, chapters related to various types of pediatric dental treatments are designed to make the events of the dental environment tangible for the child. The stages of treatment of deciduous nerve, fissure sealant therapy, treatment of various dental traumas, spacers, etc. are among the treatments that are shown in this book.

"Dana", the cartoon character of this story, thinks about 18 dental topics and his thoughtful face shows that he is not aware of that topic, and it is questionable for him. In each chapter, the images slowly and continuously teach the story to "Dana". Since it was not possible to provide 131 images in this book, the images in Chapter 8 of the book are given to get acquainted with the pattern and idea of the design team.



**Fig. 1:** shows illustrations designed for Chapter 8 of the book "Dana and Dentistry"; the long-term use of a space-maintainer until the eruption of permanent teeth is shown in Chapter 8, by illustrating the physical growth of Dana over time.

**Fig. 1** shows images of the chapter about space-maintainers in dentistry. In the following come some brief explanations stated for each image from left to right: A. Thought bubbles arising from Dana's mind regarding the topic of the chapter; "space maintainers", B. Dana experiencing toothache, C. Dana and her mother going to visit the dentist, D. Tooth extraction, E. Tilting the teeth towards the extraction site, Resulting in dental crowding, F. Dentist's smiling while introducing the band and loop, G. Cementing the band and loop, H. Impossibility of tilting of the adjacent teeth towards the extraction site, I. Eruption of a happy permanent tooth, and finally J. Dana and her mother referring to the dentist in order to remove the space-maintainer.

#### 4- DISCUSSION

The picture book "Dana and Dentistry" was designed in 18 chapters and 131 images with the participation of a pediatric dentist and an illustrator in order to familiarize 3-6-year-old children with dental topics. The book deals with major pediatric dentistry topics by creating simple images. It includes chapters on various dental treatments, such as fissure sealants, pulp treatments, and space maintainers. The book has chapters regarding growth and development such as, the age at which primary teeth erupt and the time of first permanent molar eruption. In addition, preventive dental treatments issues have been addressed in some chapters, including proper brushing techniques and the use of fluoride mouthwash. Finally, two chapters have been designed on the issue of dental trauma. The images in the two latter chapters depict the importance of timing in the prognosis of treatment. The book "Where is my tooth?" by Samira Arami tells a story about oral health in the form of the legend of the king and the minister in which the king marries a girl who has 32 pearl teeth. This book conveys the

subject to children via text. In addition to dark images, the palace and courtiers are more impressive than the subject of the book (13). The book "The Adventures of Dandonak" i.e., the small tooth, by Badri Mashhadi only deals with the role of bacteria in tooth decay and calls them "small pollen"; the concept is conveyed via text in this book, and the morphology of teeth and their position in the mouth are imaginary (13). The book "The Adventures of Buck and Terry" by Farhad Gholamian shows the role of sweet foods in caries. The story character is called "Fesghelli" who eats a lot of candies, and two idiots, "Buck" and "Terry" are illustrated in his mouth that dig a tunnel to reach the teeth roots of "Fesgheli". It is a verbal book and the exact number and morphology of the teeth are not observed in illustrations (13). In all of the three books mentioned above, a limited topic, mainly "oral health", is raised, while in the book "Dana and Dentistry", 18 topics are defined. The reason behind this difference in the content is attributed to the illustrators and authors. In the present project, chapters' topics are determined by a pediatric dentist; however, the mentioned authors did not have the expertise. Therefore, their picture books are not based on the oral cavity morphology; the point met in the present book.

The picture book "Dana and Dentistry" with colorful images, simply shows the topics of pediatric dentistry. In modern society, cultural works, such as picture books, form an important part of children's development areas. These books are a gateway to language development and the first steps towards literacy(14). Children can learn from these books before being able to read (15). Early exposure of children to these books can increase their knowledge of the world around them (16). Crawley et al., stated in a study that picture fiction books are attractive learning resources because they are short, interesting, colorful, and easy-to-read (17).

Heath et al., suggested that picture books help children become more familiar with situations normally avoided (18). Owen et al., showed that picture books might have long-term and positive effects on children's attitude towards new spaces(19); therefore, the designer of the book "Dana and Dentistry" hopes that the book images can create a positive attitude in children towards dental offices.

The picture book "Dana and Dentistry" is wordless, even the topic of chapters is illustrated with a picture of "Dana" thinking about a dentistry topic. The thought of "Dana" is depicted as a cloud above his head. The positive effect of picture books on children's education is confirmed in numerous texts. But evidence suggests that the main criterion in selecting such books should be children's developmental abilities (20). Greenhoot et al., (2014) examined the effect of storybook images. They gave parents picture and non-picture books to read with their 3-4-year-old children. They reported that reading picture books led to more verbal and non-verbal exchanges between them and their children, and helped children better remember the story events. They also highlighted the dramatic effect of images and storybook features on parents reading and children's learning (21).

Felder-Puig et al., evaluated the effects of a book designed for preoperative preparation on pre- and postoperative anxiety in 2-10-year-old children undergoing adenoidectomy. The results indicated that the book could have educational benefits, and reduce anxiety. They suggested that due to the relatively low production costs and easy prescription of the book, it can be suggested as a popular, practical, and cost-effective tool for getting the children and parents prepared for surgery and hospitalization (22). Wagner (2013) commented on the need for a qualitative database of

children's book content. He explained how such a database could be used to support theoretical claims about picture book content and identify testable hypotheses about features that help children tell stories(23).

One of the present study limitations was the illustration of anesthetic injection procedures for which the design team had no idea; it is not included in the book chapters.

To evaluate the success rate of the book design in conveying its educational goals in increasing the awareness and knowledge of preschoolers, it is suggested that further studies consider the quality of the book pictures from the perspective of preschool children and their parents.

## 5- CONCLUSION

In its initial design, the book "Dana and Dentistry" attempts to answer the common questions of children about dentistry in many pediatric dentistry topics. The book aims at improving the quality of oral health by raising children's awareness of dentistry and reducing their anxiety in dental offices.

## 6- CONFLICT OF INTEREST

None.

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