

APIPEDAGOGY AS A METHOD TO SUPPORT CHILDREN'S DEVELOPMENT

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Summary

Apitherapy for children is the targeted use of bee products to strengthen immunity and complementary therapy to official medicine in the treatment process. In the case of Apipedagogical, apitherapy for children takes place as part of regular pedagogical work in a kindergarten or school, which is mainly based on dedicated support for development through nutrition and apitherapeutic services. Bee products that are used in a targeted manner are honey, royal jelly, wax, propolis, and pollen. Apitherapy for children through target-based consumption of bee products relies on three fundamental pillars: sensory integration, nutritional values of bee products, and interoception. The completed study shows that the developmental needs of children correlate with their nutritional needs.

Healthy eating habits of children are of essential importance not only for health but also for development in all areas, including self-esteem, which, among other things, stems from a sense of successful placement in the environment and a sense of the ability to overcome challenges; in bee products, a key supporting role should be recognized in this regard.

Keywords: Apipedagogy, apitherapy, children, nutrition, health

Introduction

Apipedagogy is the name for a specific group of pedagogical programs and didactic approaches. It is mainly characterized by a special pedagogical-apitherapeutic didactic approach, which is strongly focused on healthy life in kindergarten and the direct realization of all the priority tasks of education for sustainable development.

Children learn a lot about bees, but this is a 'side success', the developmental needs of children, safe coexistence with nature, and responsibility towards the environment are in the foreground. The segment of professional apitherapy for children highlights the rights of children through the nutritional value of bee products and apitherapy services and strengthens development in all areas: emotional, psychological, social, motor, and cognitive.

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- sensory integration,
- nutritional and pharmacological values of bee products and
- interoception.

Apipedagogy as a method to support children's development

Senzory integration

This includes apitherapy services, in which the child's body consumes bee products through the skin and/or respiratory system. Certain activities and sensory perceptions trigger certain (predictable) biochemical reactions in the human organism, i.e. activation of endocrine glands to release certain hormones into the blood. These lead to predictable moods and other targeted states.

Thus, for example, playing with experimentation in the child's organism triggers the formation of serotonin, massage with honey or wax triggers the formation of oxytocin, API sensory path with wax triggers the formation of dopamine, and role-playing in api-culinary triggers endorphins. At the same time, bee products have not only educational value but also apitherapeutic and nutritional value - the components of bee products enter the process according to the

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principle of synergy: the pedagogical, pharmacological, nutritional, and therapeutic effects of bee products create a new holistic whole, which represents development support with the help of apitherapy.



Figure 1. Tasting different types of honey with eyes closed

Nutritional values of bee products

As shown in Figure 1, activities are included in which children consume bee products as food. Nutrition affects the organism holistically. Healthy children whose basic needs are satisfied do not have unwanted behavioral deviations, because they feel good, they are in a good mood because they can keep up with the daily routine in kindergarten. Irritability in interaction with peers and mood sensitivity of the child is in most cases related to poor ventilation of the organism (completely or partially blocked airways, asthma, etc.) or other unfavorable health conditions and should not be considered as a character trait of the child in the preschool period, but to improve the condition, take a nutritional approach.

Interoception

Interoception is the ability to perceive inwardly. The five senses, smell, taste, hearing, touch, and sight, are the external perceptual abilities of the body, i.e. the ability to perceive the surroundings. Interoception is the ability to perceive processes or conditions inside the body. Interoception includes all signals from the internal organs, including the cardiovascular system, lungs, intestines, bladder, and kidneys. There is a constant communication dialogue between the brain and internal organs (Robson, 2021). It should be pointed out that interoception is directly related to the feeling of intuition, which is a certain awareness of a need without a tangible explanation for the decision made, resulting from this perception (Kim et al., 2021).

Observations in the implementation of apitherapy for children in kindergartens in the period 2017 - 2023 show that most children in a certain developmental stage show a desire for a certain type of honey, under the needs of physical development and/or current life situation or health condition.

Research of Apipedagogy to support children's development

Methods

Apitherapy for children as a targeted use of bee products through the pedagogical-apitherapeutic approach of the behavior sampling method recognizes the developmental needs of children and prepares pedagogical activities in kindergarten accordingly. In the field of developmental psychology, in addition to the behavior sampling method, the observation method and the time sampling method are also needed.

To monitor the contrast between a group of children receiving a pedagogical-apitherapeutic approach and a group of children not receiving apitherapy for children, the inductive approach of the comparative-analytical method in combination with the methods of developmental psychology is valid, with careful observation remaining the leading element (Paulus and Stein, 2010).

The study took place over a longer period, 2017 – 2023, and covered all age groups of kindergarten preschool children, i.e. from the age of 1 – 7 years. Two variables were paralleled, namely the children's developmental needs on the one hand and their interoception as an influencing factor in the choice of honey variety on the other hand. The children had five different types of honey at their disposal: acacia, flower, forest, linden, and chestnut. Each type of honey is characterized by a specific ratio of ingredients, which results in differences in the effect on the human body. These deviations are purposefully used in apitherapy. Educators and parents of children participated in the study with the head of the API Kindergarten program.

The study presented in this paper differs from similar studies in the field of interoceptive abilities in preschool children primarily in terms of methodology. While the study from abroad - The new Jumping Jack Paradigm, 2019, which was considered for contrast, was based on the method of talking to children and measuring their heart rate (Luca et al., 2019), the present study, conducted in API kindergartens in Slovenia, is based on a methodology which comes from pedagogy and developmental psychology. In addition, The new Jumping Jack Paradigm focuses on the conscious interoceptive perceptions of preschool children, and the pedagogical-apitherapeutic approach mainly follows the results regardless of whether the interoceptive perceptions of children are conscious or subconscious.

Results and discussion

During 1-3 years, children develop extremely fast in all areas. The areas of development in this age period are inextricably linked: the absence of the possibility of free natural movement, in addition to reduced motor development, results in reduced development in all other areas as well, including a lag in the cognitive area of development. During 1-3 years, children are in the so-called sensory-motor phase, which consequently means that they need a lot of energy for a lot of movement. Since the physical development of the digestive organs is not yet at full strength during this period (significant progress on the motor, cognitive, and digestive levels), it is recommended that during this period they obtain energy from nutrients that provide them with support in this sense.

This is also evidenced by the children's interoceptive perceptions, when in the period 1-3 most children choose honey that has a distinctly sweet taste, in the vast majority it is acacia honey, and it is not just about the pleasure of the sweet taste. Acacia honey, with its high sugar content, is an excellent source of immediate energy. The higher content of fructose in acacia honey is practical support at the digestive level because when consumed, fructose is absorbed more slowly and gradually and is converted into glucose and released into the blood per the needs of the body (Ilič, 2023). In this way, it simplifies the balance in the body, as it does not burden digestion and represents a quick source of energy that is fully absorbed without residues. Based on the results of monitoring children, it can be concluded that the latter is a decisive factor in children's decisions since flower honey also has a distinctly sweet taste - acacia honey contains more fructose, while flower honey contains more glucose.

During 3-4 years, children are getting to know the world more intensively, and they are no longer near their parents all the time. During this period, they increasingly come into contact with a variety of germs, bacteria and other challenges, for which they primarily need a good blood count, which represents the first line of defense in maintaining the body's immunity, since during this period, as a rule, they no longer get antibodies through mother's milk (Ilič, 2023).

This is also evidenced by the interoceptive perceptions of children when in 3-4 years they overwhelmingly prefer darker honey, mostly forest honey. Forest honey is characterized by a higher content of mineral substances, which provide support precisely in the area of good blood count, support for the supply of tissues with oxygen, and balanced digestion.

During 5-7 years, children are mainly full of energy and have a strong need to live it out physically much more independently. During this period, as a rule, they have already formed their taste in terms of food; [...] They are physically quite skilled, but while exploring their limitations they also experience injuries more often (Ilič, 2023). This means that during this period of life, they benefit most from foods that have a high nutritional value, support in combating pathogenic organisms that invade the wounds, and are not burdensome to the digestive system (mainly because children are generally in motion a lot during this period).

As can be seen from Figures 2 and 3, this is also evidenced by the interoceptive perceptions of children, who in the period of 5-7 years mostly prefer darker honey, especially chestnut honey. Chestnut honey is a honey with a high nutritional value due to its high pollen content. Among its more important characteristics is the fact that it has the greatest disinfecting and antibacterial power among kinds of honey. Interestingly, children are generally not bothered by the bitterness of chestnut honey during this period, from which we can once again conclude that the choice of the

preferred variety of honey in the preschool period is not solely subject to the sweetness of the honey, but is most likely also a matter of a clear intuitive feeling of what they need. In addition, just like acacia honey, chestnut honey is characterized by a ratio between glucose and fructose in favor of the latter, which means that chestnut honey is a food with high energy and nutritional value, which, like acacia honey, is gentle on digestion.

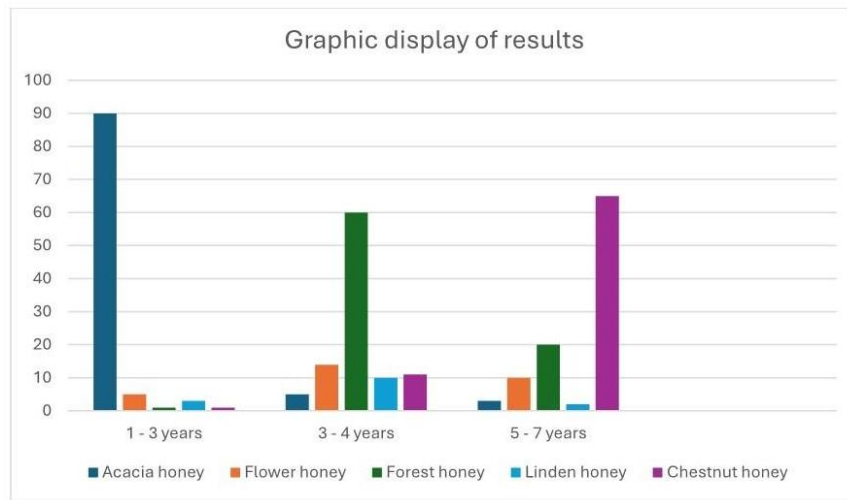


Figure 2. Graphical display of results

New experimental approaches and methods of such research revealed a lot about the processing of afferent signals from the internal organs of the body and enabled more precise descriptions of these processes and a more precise determination of their functional significance in human experience and behavior (Dieter, 1996). In this, all organ systems, neuromuscular, respiratory, gastrointestinal, cardiovascular, and others, play an equally important role, especially because these are factors that can influence perception judgment, which is essential for sensory integration and the child's development resulting from it (Simmons and DeVille, 2017).

This research is important because of the opportunity for further research and finding solutions also in the field of challenges faced by children with special needs, since the pedagogical-apitherapeutic methodology for monitoring needs and results does not condition the level of cognitive or motor skills of the child. In addition, it does not focus only on the question of the level of perception of internal events, but directs attention constructively: what are the nutritional deficits / individual nutritional needs of the child and with which bee products and with what methodology can they be provided in the context of apitherapy for children within Apipedagogy.



Figure 3. Children define the choice of honey

The results of observations in the implementation of apitherapy in Slovenian API kindergartens in the period 2017-2023 can be used constructively in the practice of apitherapy for children. An apitherapist and/or a nutritionist are not competent to make a diagnosis about a child's health condition, but they can identify a child's nutritional needs also based on good observation and a conversation with educators and parents.

There are several ways to obtain concrete information from a child and, taking into account the level of the child's psychological and cognitive phase in the preschool period, communicating the child verbally through conversation is certainly not the main one. Based on the honey that is 'intuitively' chosen by the child, who has not yet mastered verbal communication to the extent that he would participate in an authentic and constructive conversation about his health (health is not the same as well-being), the apitherapist recognizes the general state of the child's organism and constructively acts following these observations.

For optimal development, the child needs those nutrients,

- which build cells, bone and periosteal tissues, muscles, skin, and connective tissues (proteins),
- to reduce the density of food and regulate the passage of food through the digestive tract and slow down the absorption of glucose into the blood (fiber),
- which are a source of energy, for the formation of glycogen in the muscles and food for the nervous system (carbohydrates),
- which represents a reserve source of energy, for building cells, protecting internal organs from extreme temperatures, and enabling the absorption of fat-soluble substances (fats),
- which enables the metabolism of the listed nutrients (vitamins and minerals) and
- which enable resistance to infections (all of the above).

In short, the healthy eating habits of children and the inclusion of apitherapy are of essential importance not only for health but also for development in all areas, including self-esteem, which, among other things, originates from a sense of successful placement in the environment and a sense of the ability to overcome challenges; in bee products, a key supporting role should be recognized in this regard (Critchley and Garfinkel, 2017).

Bee products do not enter the diet of children in the same way as general foods intended for human consumption but as occasional supplements. Honey is energy- and nutritionally rich and at the same time easily digestible food with pronounced pharmacological and nutritional effects. Propolis is stronger in pharmacological than in nutritional effects, which means that it mainly represents direct support in the field of preservation and maintenance of the immune system and in overcoming pathogenic conditions. Pollen, like honey, is energy- and nutritionally rich and at the same time easily digestible food with pronounced pharmacological and nutritional effects. In this research, wax comes into use primarily through the consumption of honey in its original packaging, i.e. in the honeycomb, and through sensory use, and royal jelly in the considered context mainly represents positive pharmacological effects.

The substances available to the child's organism and obtained through nutrition are among the most important elements that build and guide human development from the prenatal period onwards. Neural connections in the brain, which are formed based on experiences in the preschool period, build and shape the foundations for a lifetime. Through apitherapy for children and the apipedagogical methodology, which focuses mainly on prevention in kindergarten, and outside the kindergarten and also on support in the healing process, bee products play an important role in establishing nerve connections that serve as a basis for emotional resistance, academic success and the ability to live healthy enforcement in society. A child who approaches challenges with the attitude that he can do it, because he is getting the substances and experiences he needs for his development, has a better self-esteem, is more successful in both social and cognitive competencies and, as a result, also has a stronger immune system.

Conclusions

According to the results of monitoring children in kindergartens, there is a correlation between their choice of preferred honey and their body condition. Children who faced stress during that period (parental separation, moving, etc.) in 50% of cases more often reached for darker honey or a type of honey that they would not have preferred under normal circumstances than they would have otherwise typical choice. From the above, it can be concluded that there is a possibility that interoception in healthy children takes place with fewer deviations, i.e. children who otherwise feel well can more easily feel what they need on an unconscious level, while in children who face challenges, this internal voice may not be as successful, or perhaps the changed circumstances affect the biochemical sphere in the body to such an extent that the needs regarding the ratio of nutritional substances also temporarily change.

It should be noted that the children monitored were free of developmental problems and congenital disorders. For a more accurate and broader picture, it is necessary to include children with special needs in the observation as well as other bee products, especially propolis and pollen. Due to its effect on endocrine glands in the preschool period, royal jelly is not recommended for regular consumption, except in specific exceptional cases.

In addition, for more credible results in the data analysis itself, it is also necessary to take into account the fact that not all children develop according to the same principle. In the preschool period, two children of approximately the same age can both be healthy, but one develops faster in the motor area and the other in the cognitive area. Optimal nutritional support in physiological terms would be similar for them, but not the same. The latter is not only true because of differences in development, but genetics also has a certain say.

Interoception in apitherapy for children is a perspective element that should be paid attention to. Internal body signals influence children's behavior and emotions, which can be recognized as an opportunity and responsibility for apitherapists, educators, and parents. These are predictable signals that can be used constructively. Food is your medicine and your medicine should be food.

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