

Anomalies of Fingers and Vegetables. Clinical and Biological Parallels

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Abstract

Some forms of congenital anomalies of fingers in appearance similar to the deformation of the fruit of cucumbers and carrots. We made analysis of the most important causes of these disorders. It was discovered that there is not only the resemblance of defective fingers and fruits of cucumbers and carrots, but the similarity of the reasons causing these abnormal changes. These are so-called endogenous and exogenous risk factors, including, in particular, genetic disorders.

Keywords: Children; Congenital Abnormalities of the Fingers; Vegetables; Carrots; Cucumbers; Risk Factors; Deformations

Introduction

In present time, congenital malformations of fingers in children are fairly well studied orthopedic pathology and described in the scientific literature. Embryological studies of the stages of development of the upper extremity, including ultrasound showed that hand as organ, was formed by 4 - 7 week of fetal development from undifferentiated mesenchymal tissue in the embryo of 13.5 mm in length, and was like fin-shape projections or had the form of a "hands-kidneys" [4,11,13-16,22,24,25]. During the 4 week, a differentiation of mesenchymal tissue was beginning, the hand was becoming flattened; separating from the forearm, and formation and finger digitation was detected at the 5th week of life of the fetus. During this period, the initiation of the metacarpal bones and wrist bones was carried out, and by the 6th week, the skeleton of phalangeal bones has appeared. On the 6th week, the primary palmar pads were are formed in the embryo, contributing to the grip function. Simultaneously with the bone elements, muscles and tendons, blood vessels and nerves were developed. On the 7th week, a hand was shaped like the hand of an adult.

This period in the fetal life is crucial in terms of exposure to risk factors that cause congenital malformations

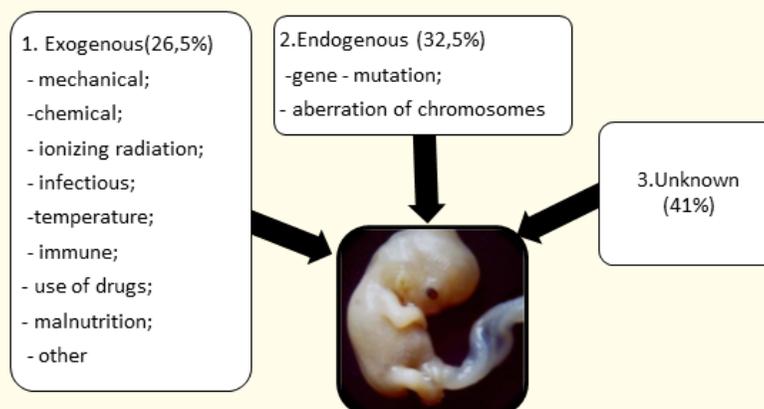


Figure 1: The factors contributing to the occurrence of congenital malformations of upper limb (compiled by the author: 1-3,8,9,13,15,19,23,26,27,29).

The most frequent forms of pathology are polydactyly (increased number of fingers), syndactyly (fusion of fingers), congenital constriction, deformation of the axis (clinodactyly), “claw”-shaped hand and hypoplasia of the thumb.

Case Report

In our study of congenital malformations of the hand revealed the resemblance of some forms of pathologic features having the appearance of a number of fruits of vegetables such as cucumbers, carrots (Figure 2-7).

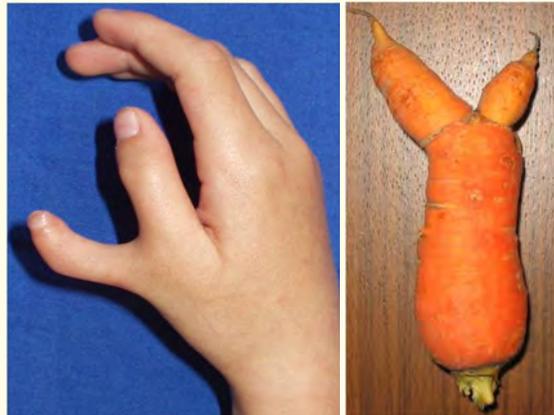


Figure 2: Polydactyly of the thumb (a) and similar deformation of carrot (b).



Figure 3: Syndactyly of fingers (a) and similar deformation of cucumbers (b).



Figure 4: Congenital constriction of fingers (a) and similar deformation of carrot (b).



Figure 5: Clinodactyly of second finger (a) and similar deformation of carrot (b).



Figure 6: "Claw" of the right hand (a) and similar deformation of carrot (b).



Figure 7: Hypoplasia of the thumb (a) and similar deformation of carrot (b).

We drew attention to such deformations in the development and growth of fruits as their fusion, the curvature of the axis, presence of retractions. Causes of mutations among vegetables are explained by the different versions. A genetic predisposition to such phenomena, varietal differences have been discovered. One of them concerns the breeding heterotic hybrids of cucumber, when the seeds are taken not from fruits of the grown and fruiting plants, but each time again, by crossing the parent couple of plants or the maternal or paternal forms [7]. A side effect of breeding heterotic hybrids, aimed at accelerating the harvest and increase of capacity of the root system and above-ground systems, is expressed in the fusion between the fruits and change of form (the curvature). However, as noticed by experienced gardeners, when cultivating conventional varieties such distortion was not detected. Such changing the shape of the fruits as axial deformations in cucumbers is caused by violation of the chemical composition of the soil (lack of potassium or nitrogen and the overabundance of magnesium), i.e. the environment, which is shaped fruit. The root crops are also deformed at high temperature with lack of moisture. Fusion cucumber ovaries provoke stress going through by young plants, in particular-long seedling hardening at a temperature below 16°C.

To avoid such problems, it is necessary to take into account the seeding rate per square meter. It is important to pinch the side shoots of cucumbers.

Cucumber's fruit, in any case, should not be partly obscured by trees or buildings.

Curvature can also be caused by common nutritional deficiencies if it is insufficient [5]. Plants require continuous flow of nitrogen, phosphorus, potassium and, of course, magnesium. The deformed cucumbers consume a lot of nutrients, which prevents the formation of new fruits. For this reason, they must be removed as soon as possible [20].

As for the appearance of retractions on the type of constrictions on fruit carrots (Figure 4-b), their appearance is connected with the growth of the body of the carrots in the soil of different density. Branching roots with simultaneous multiple pregnancy or syndrome of "polycarrots" (Figure 2-b, 6-b) is due to the reaction of the fetus to harmful chemical substances (chlorine and calcium) in the soil and its acidity [12]. Another reason is untimely fertilization or composting and poor breaking up of soil [8].

If the soil on the site is heavy, clayey or rocky, it is likely to form clumsy carrots, because as they grow root crop will meet obstacles on its way in the form of a compacted soil and, due to this, it will bend [17,18]. To avoid deformation of carrots, it is necessary to mix the soil beds with a lot of sand- due to the sand, the roots turn out to be even and beautiful.

Ugly carrots can be not only curved, but the horned or multiple. Damage to the rootlet at an early stage is the most important reason why carrot horned. In addition, the reasons for this phenomenon were as follows. Fragile roots could be damaged by planting. In addition, if there is little moisture in the soil, the tip of the root, in this case, dies first. The cause of carrots deformations were ash, dolomite or lime introduced into the soil, or large doses of calcium, which are contraindicated to carrots.

Thus, the appearance of fruit deformities in vegetables can also be explained by the influence of genetic factors and environmental factors.

Comments

Discovered similarities of abnormal fingers and fruit of vegetables were not only very interesting, but rather unexpected to us. We decided not only to ascertain the identities of the forms of deformity found, both clinical and biological, but also to analyze the nature of the causes leading to such changes. In both cases, there was a genetic predisposition to the occurrence of deformities of fingers and vegetables as an endogenous risk factor for the development of anomalies.

In other cases, the causes of anomalies were exogenous factors (26,5%), including physical, biological, chemical, etc. In addition, if a man has almost 41% of cases, the nature of congenital malformations of the fingers were unknown in the fetal development biology this is not mentioned in the studied literature by us. Based on studies of the genetic pool of cucumbers from a collection of ALL -Russian Research Institute of Plant Industry, West Siberian vegetable experimental station, developed and refined methods of evaluating the cucumber on the morphological, biological, and economically valuable traits [28].

The suitability of cucumbers for various directions of selection (industrial technologies, keeping quality and transportability of fruits of production in individual and farm economies, etc.) has been determined.

To correct the identified anomalies of the fingers and vegetables certain actions are taken. In the first case, children with congenital malformations of the fingers are under the supervision of pediatric orthopedic surgeons. Pediatric orthopedic surgeon timely perform the treatment, eliminating anatomical, functional and aesthetic disorders. This allows to ensure the correct growth of the fingers of the hand, improves the function of handgrip and its aesthetic appearance.

Skin and bone plastic surgery, it is advisable to do in the first year of a child's life. In the second case, farmers and agricultural specialists are engaged in correcting deformations of the fruits of cucumbers and carrots. Creation of special climate for the growth of vegetables, breaking up of soil, introducing the necessary fertilizers serves to prevent the development, provides an appearance and excellent taste qualities [21].

Conclusion

More than 50 different exogenous factors cause the formation of congenital malformations of fingers in children. The greatest risk is the fetus at the age of 4 - 7 weeks at the time of initiation and dividing the fingers of the hand. Programs for the rehabilitation of children with anomalies of the hand, including surgical treatment, prosthetics and the use of methods of play therapy in the functional restoration of the ugly hands have been developed.

The appearance of deformations of vegetables' fruits may also be associated with the influence of genetic factors and environmental factors. Causes of deformation of cucumber and carrot fruits are disturbances of microclimate parameters (air and soil temperature, air humidity and soil), noncompliance with agricultural technology (nutrition, care of plants), plant damage to pests and diseases.

Following the results of scientific researches in 2013, the technological regulations on the cultivation of cucumbers and carrots are developed. They helped to achieve the planned level of yield and a positive balance of nutrients in the soil, as well as high economic benefit.

Conflict of Interest

No conflict of interest to declare.

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