

# Surgical treatment of a nasal dermoid cyst: open rhinoplasty

## Leczenie chirurgiczne torbieli skórzastej grzbietu nosa: rynoplastyka otwarta

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### ABSTRACT:

**Introduction:** Dermoid cysts (or dermoids) are benign tumors which belong to choristoma group (teratoma). Nasal dermoid cysts (NDCs) are the most common congenital defect of the nasal midline. The diagnosis is usually established at an early age - mainly by the age of 3. Due to late diagnosis and/or delay of surgical treatment, facial deformities, recurrent infections (festering of cysts or subcutaneous infections), nasal blockage or intracranial complications may occur.

**Case report:** This paper presents a clinical case of a 7-year-old boy admitted to the ENT department of the Lviv Regional Children's Clinical Hospital „OHMATDYT” with symptoms of ongoing pain, swelling and caseous discharge from the fistulous tract on the nasal bridge. Diagnostic MRI showed a bone-shaped structure in the subcutaneous tissue of the nasal bridge. After evaluation, the dermoid cyst was successfully treated surgically with open rhinoplasty. No complaints were reported during the 2-year post-operative period.

**Conclusions:** NDC is a subcutaneous cyst, which derives from the ectoderm and mesoderm. In addition to clinical signs, the radiological imaging methods – CT and MRI – are crucial for NDC diagnosis. The effective method of NDC treatment is radical surgical resection.

### KEYWORDS:

congenital nasal masses, dermoid cyst, open rhinoplasty

### STRESZCZENIE:

**Wprowadzenie:** Torbiel skórzasta to łagodny guz typu choristoma, będący odmianą potworniaka. Torbiel skórzasta nosa (TSN) jest najczęstszą wrodzoną wadą linii pośrodkowej w obrębie nosa. Rozpoznanie jest zwykle stawiane do 3 r.ż. W przypadku jego opóźnienia lub leczenia zabiegowego mogą wystąpić powikłania w postaci: zniekształceń twarzy, nawracających zakażeń z zapaleniem tkanki podskórnej albo zropieniem torbieli, nieżyty nosa lub powikłań wewnątrzczaszkowych.

**Opis przypadku:** W artykule przedstawiliśmy przypadek 7-letniego chłopca przyjętego do oddziału laryngologicznego Regionalnego Dziecięcego Szpitala Klinicznego „OHMATDYT” we Lwowie z powodu utrzymującego się bólu i obrzęku grzbietu nosa z wyciekami serowatej treści z przetoki. W MRI uwidoczniło się kostną strukturę w tkance podskórnej grzbietu nosa. Rozpoznano torbiel skórzastą, którą z powodzeniem leczono operacyjnie otwartą rynoplastyką. W okresie dwuletniej obserwacji po zabiegu chory nie zgłaszał żadnych dolegliwości.

**Wnioski:** TSN jest torbielą rozwijającą się z ekto- i mezodermi. Oprócz objawów klinicznych dla postawienia rozpoznania niezbędne są badania obrazowe (TK lub MRI). Skuteczną metodą jej leczenia jest radykalna resekcja chirurgiczna.

**SŁOWA KLUCZOWE:** otwarta rynoplastyka, torbiel skórzasta, wrodzone guzy nosa

### ABBREVIATIONS

**NDC** – nasal dermoid cyst

**ENT** – ear, nose and throat

**MRI** – magnetic resonance imaging

**CT** – computed tomography

### CASE REPORT

A 7-year-old boy with minor swelling and purulent discharge from the fistula located on the nasal bridge was admitted to the ENT department. During the examination of the central part of the nasal bridge, a fistulous tract with purulent content was observed. The

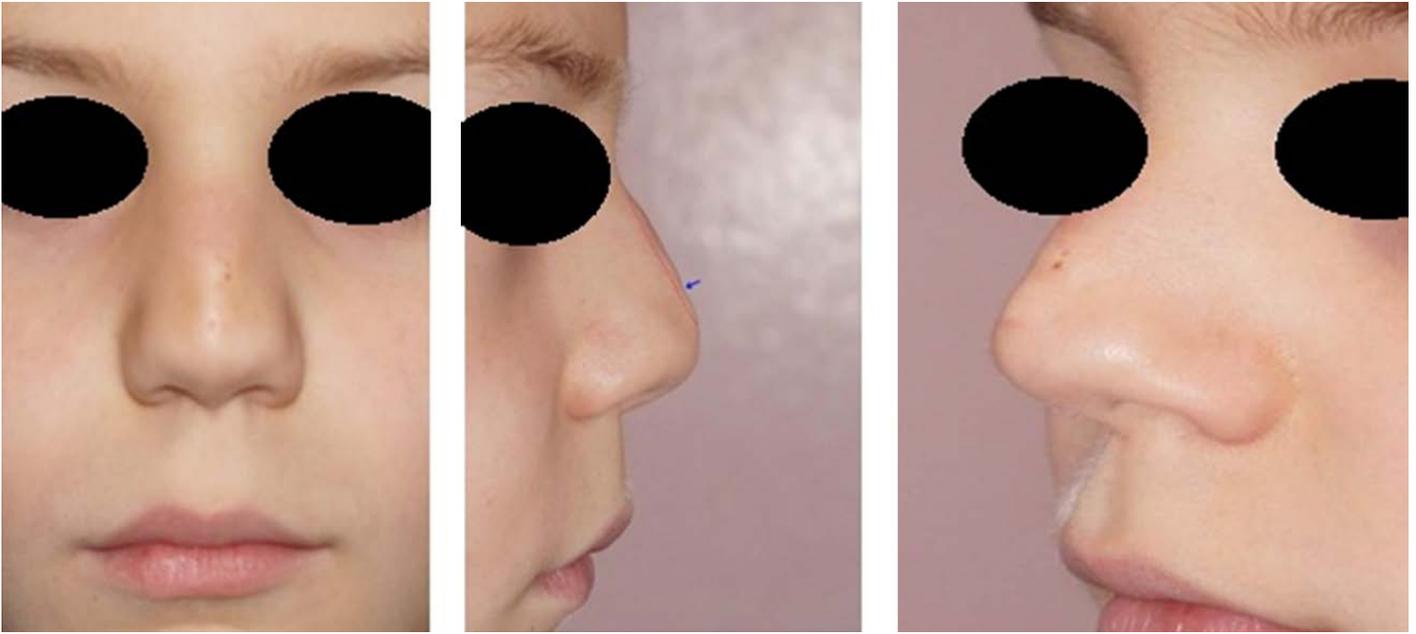


Fig. 1a., 1b., 1c. The patient before surgery.

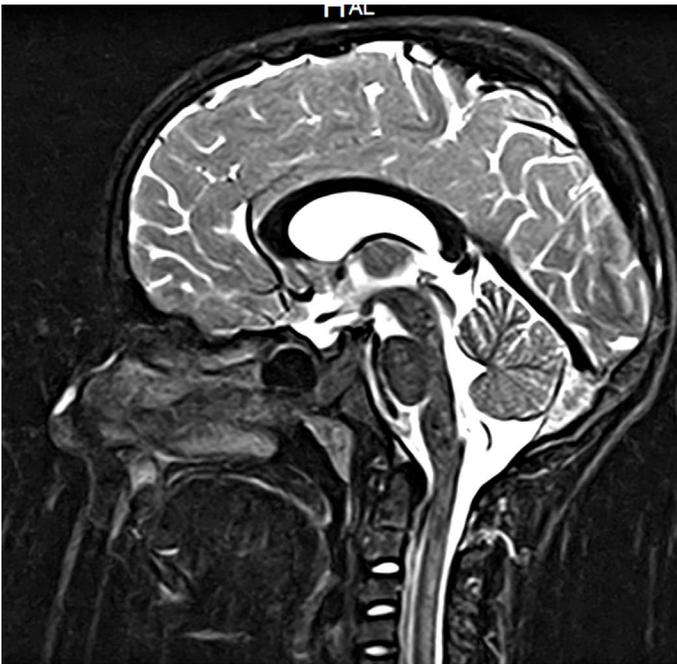


Fig. 2a., 2b. MRI of the patient's head – sagittal scans.

skin was hyperemic. No other pathologies were found in the ENT region. The primary diagnosis was a nasal dermoid cyst with inflammation of the surrounding soft tissues. In the history this boy had been referred to an otorhinolaryngologist at the age of two, which resulted in conservative treatment at hospital, after which he was discharged in a satisfactory condition.

At the age of 7 the patient sought medical advice at the ENT department of the Lviv Regional Children's Clinical Hospital „OHM-ATDYT” with symptoms of ongoing pain, swelling, nasal bridge hyperemia and caseous discharge from the fistulous tract on the nasal bridge (Fig. 1a.–c.). The patient played football, which resulted in him sustaining nasal injuries. Those incidents led to in-

flammation of the cyst, which in turn prevented the patient from further sports activities. The patient was referred for a head MRI. The MRI showed a bone-shaped structure in the subcutaneous tissue of the nasal bridge, measuring 12x4x5 mm. A fistulous tract of a length up to 40 mm emerged from the described structure to the skull base. However, no intracranial connection was found (Fig. 2a., b.). The decision to surgically remove the cyst was made after reviewing the patient's medical history, ENT examination and MRI result.

Surgery was performed under general anesthesia. External columellar access was applied (open rhinoplasty) (Fig. 3a., b.). The fistulous tract and cyst located between the nasal bones and



Fig. 3a., 3b. External columellar access (open rhinoplasty).

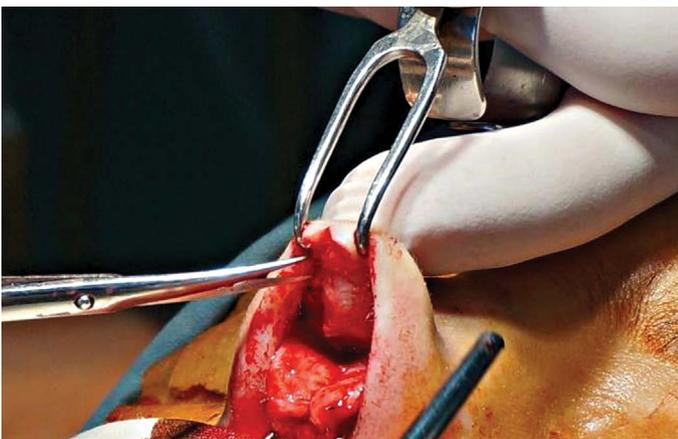


Fig. 4a., 4b. Isolation of fistulous tract and cyst.

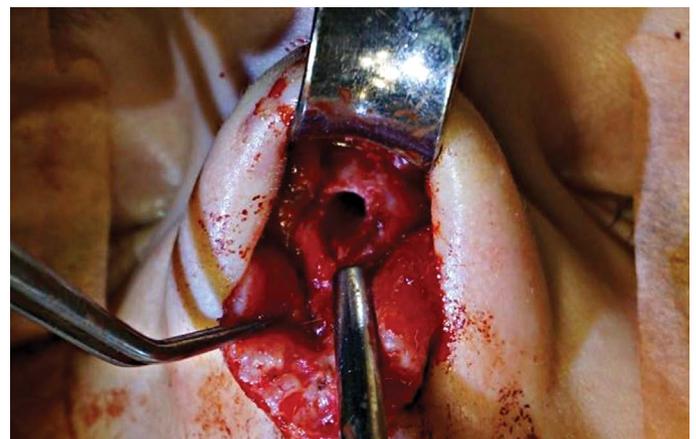
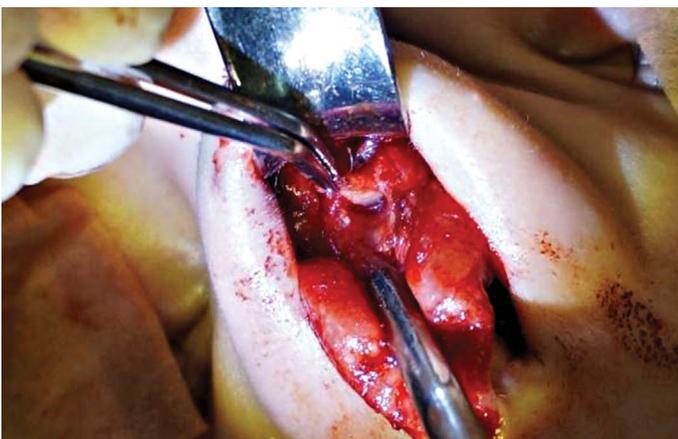


Fig. 5a., 5b. Complete removal of dermoid cyst and fistulous tract.

the erosive nasal septum were carefully removed, without causing any damage. Next, the surrounding soft tissues were separated, with maintaining the integrity of the fistulous tract and cyst (Fig. 4a., b., 5a., b.).

The material obtained during surgery was sent to the histopathological examination. It revealed that the dermoid cyst contained fragments of fibrous and fat tissue. No complications were reported during the postoperative period. After 10 days the patient was discharged from hospital in good condition.

Since the surgery, the patient attends follow-up visits regularly. No complaints were reported during the 2-year post-operative period. The aesthetic result is satisfactory (Fig. 6a.–c).

## DISCUSSION

Pathogenetically, NDC has been of mixed origins, often resulting from sequestration of cutaneous tissues along embryonal lines of closure. NDC is a subcutaneous cyst, which derives from the

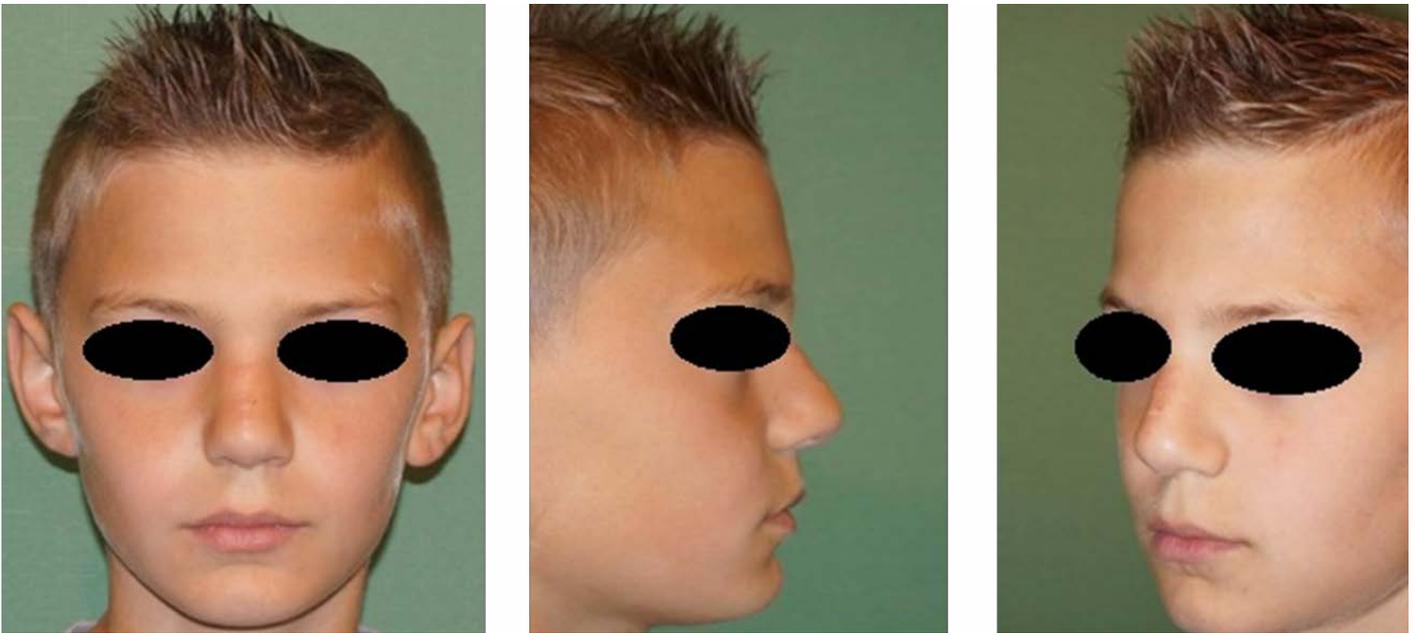


Fig. 6a., 6b., 6c. The patient 2 years post-op.

ectoderm and mesoderm. It contains not only ectodermal (multilayered squamous cell epithelium), but also mesodermal components.

There are several theories explaining the origin of this pathology. In 1893 Bland-Sutton introduced the theory of superficial sequestration. It assumes entrapment of the epithelium during nasal bone development, which can result in formation of a fistula or a cyst [4]. This theory applies only to superficial structures. Nevertheless, it does not explain the pathogenesis of cysts with intracranial extensions. Another theory – called a three-layer theory, was developed by Littlewood and published in 1961. This conception based on the idea of embryogenesis of the nasal septum from the central layer of the ectoderm and two layers of the cartilaginous tissue.

The most appropriate theory is Grunwald's prenasal space theory, which is alternatively called the Pratt's nasal theory or Bradley's cranial theory. According to this theory, prenasal space is located between the nasal capsule (precursor for nasal septum and nasal cartilages) and nasal bones, and is based on the incorrect embryological development during fusing and ossifying of these structures. As a result, prenasal space cannot be closed correctly, which is suspected to be the reason for NDC formation [4]. Histologically, dermoid cysts consist of a fibrous capsule of squamous cell epithelium and adnexal structures, such as hair follicles, sebaceous and sweat glands.

All dermoid cysts are congenital. They are often diagnosed in childhood (predominantly at the age of 3) or in adolescence, when symptoms start to appear. The presence of NDC is rarely associated with a variety of congenital malformations such as cleft palate, cleft lip, esophageal atresia, microcephaly, hypertelorism or heart and kidney failures. Such combinations occur in 25–30% of cases [5].

Clinically, this pathology is manifested by the presence of an isolated deformation on the nasal bridge, or a fistulous tract with an opening on the skin. The pathognomonic sign of NDC is the

presence of hair in the fistula. However, this symptom is rare – it is recognized in only 15–20% of patients. More frequently, the main manifestations include accumulation of pus or caseous discharge from the fistula, formation of abscesses which can be complicated by osteomyelitis, and can lead to nose deformities. The clinical course of a nasal cyst depends on additional infections. Dermoid cysts develop slowly; however, after nasal injury, their development accelerates substantially. Occasionally, suppuration with subsequent breakthrough of the cysts' contents may appear, which leads to the formation of a stable fistula. When the cyst is located on the nasal bones, the fistulous holes are positioned at the internal angle of the eye. The erosion can be temporarily closed by the time of a new relapse of inflammation. Congenital cysts cause only a slight recess on the nasal bridge, which can last a long time.

Approximately, 30% of NDC cases result in the occurrence of some complications. These are mainly intracranial ones, among which abscesses of the brain are very frequent, resulting in meningitis or osteomyelitis. Almost 57% of affected patients are in danger of intracranial dissemination. It has been confirmed that, should the child have any associated developmental defects, the risk of intracranial complications increases [8]. Such complications are mainly manifested by headache (32.6%), convulsive attacks (26.5%), cerebral ischemia with motor and sensory deficiency (16.3%) and aseptic meningitis (8.2%). These symptoms arise as a result of the compression of adjacent neurovascular structures [9]. If intracranial complications are detected, the management will consist of craniotomy with resection of the intracranial part of the skin and the plastic closure of defects or open rhinoplasty with the following craniotomy. Open rhinoplasty provides the best access and cosmetic result [6].

In addition to clinical signs, the radiological imaging methods – CT and MRI – are crucial for NDC diagnosis. Preoperative imaging is a necessary guide for a surgeon. The radiological images not only illustrate the pathological process, but also confirm or deny the presence of intracranial extension.

The effective method of NDC treatment is a radical surgical resection. The aim of this procedure is to achieve complete removal of cysts present in order to prevent recurrence and deformities of the nose. Many surgical approaches were described: lateral rhinotomy, transverse rhinotomy, open rhinoplasty, horizontal nasofrontal incision, reverse U-incision and others [2]. It depends directly on the

individual characteristics of the NDC in each patient as to what kind of surgical treatment should be applied. Our case demonstrates the peculiarity of the location of dermoid cysts and the need to use radiological assessment in the examination of children with this pathology. It also shows the significance of using limited rhinoplasty when removing the NDC, to obtain good cosmetic results.

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