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110th anniversary of the Filatov's «walking» tubed pedicle in surgery

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Abnormalities of the anatomy of the facial structures due to congenital or acquired defects cannot always be managed with the transfer of either local soft tissues or an autologous flap which can be limited by inadequate tissue blood supply and other disadvantages. In 1916-1917, V.P. Filatov proposed to use a round (also known as tubed) pedicle flap in plastic procedures [1-3] not only in ophthalmic surgery, but also in other surgical disciplines, and this became one of his primary areas of research. That is why the tubed pedicle is referred to in the literature also as the Filatov's pedicle. The method consists in the formation of a suitcase-handle shaped skin-and-adipose tissue pedicle in the anterior abdominal wall, neck or submandibular area (Fig. 1).



Fig. 1. Round pedicle formed in different neck areas

In three weeks, to make the first step, the distal end of the pedicle is severed, turned towards the defect, and anchored to the soft tissue. The following steps can be performed in 14-16 days. The number of steps depends on the length of the pedicle and the distance from the site of pedicle formation to the site of defect closure. A good blood supply of the pedicle enables its tissue healing at the areas with insufficient blood supply and is beneficial for forming the anatomical structures e.g., the eyelid, lips, or nose and closing other facial and body wounds.

Of note that, in 2014, the late Academician V.P. Filatov was honored for his pioneering work in corneal transplantation and tissue therapy, and inducted into the American Society of Cataract and Refractive Surgery (ASCRS) Ophthalmology Hall of Fame (Figs 2 and 3).

Here we present three cases of the use of the Filatov's pedicle (or tubed pedicle) to close the skin and soft tissue defects of the eyelid, orbit and periorbital area.

Case 1

Case 1 was a 64-year-old male who presented to the institute with the diagnosis of basal cell cancer of the left eyelid, orbit, and soft tissues of the forehead, parietal and temporal areas after he had been treated at a general cancer center near his place of residence. He received a subperiosteal orbital exenteration with two courses of



Fig. 2. Academician V.P. Filatov, ophthalmologist and poet

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Fig. 3. American Society of Cataract and Refractive Surgery (ASCRS) award to Vladimir P. Filatov, MD

radiation therapy (with a total dose of 110 Gy) due to tumor spread to orbital tissues. Six months after surgery, continued growth of a forehead tumor was noted (Fig. 4).

Extensive defects of the skin and soft tissues of the orbital margin and forehead area developed, but we failed to achieve a complete closure of the defects with local tissues. Therefore, a decision was made to use a free skin flap from the anterior abdominal wall and form a tubed pedicle (or Filatov's pedicle) (Fig 5A-D).

A Filatov's pedicle with a maximum length of 12 cm and thickness of 1.5 cm was formed at the left neck and submandibular area to close a residual soft tissue defect in the forehead and superciliary areas (Fig. 5).

Due to an increase in the size of the defect in the superciliary area in the presence of soft tissue necrosis in the forehead area, an additional tubed pedicle was formed in the right submandibular area (Fig. 6) and step 1 was made from the pedicle in left submandibular area to the preauricular area (Fig. 7). Each subsequent step of the pedicle to the right and to the left was made two weeks after the previous step (Fig. 8A-B).

Due to continued tumor growth with involvement of the right orbit and nasal root and sidewall, the patient received partial right orbital exenteration, resection of the nasal root and excision of the nasal sidewall tumor with preservation of the eye. Defects of the right orbit and nasal root were closed with the Filatov's pedicle (Fig. 9).



Fig. 4. Patient with recurrent basal cell cancer of the left eyelid, orbit, and forehead, parietal and temporal areas (blue arrow)

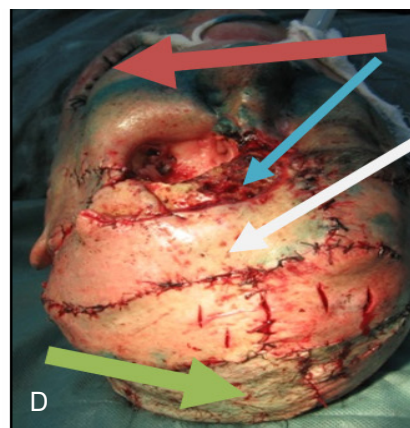
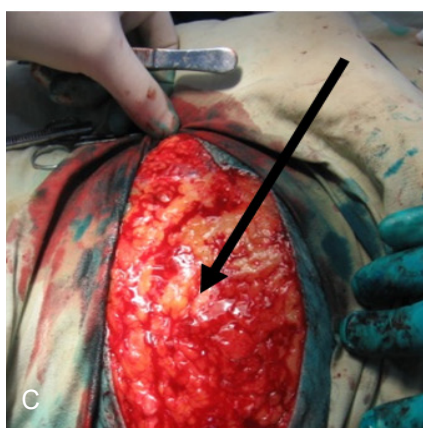
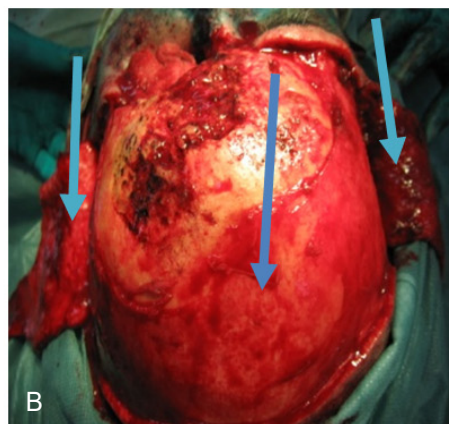
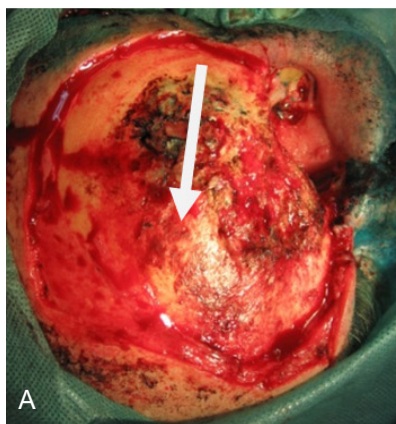


Fig. 5. Stages of surgery for continued growth of cancer of the scalp and soft tissues in the forehead and parietal areas. (A) Resection of the forehead tumor with periosteum (white arrow). (B) Undermining skin flaps in the temporal area (blue arrows). (C) Skin defect in the anterior abdominal wall after taking a flap from the wall (black arrow). (D) Closing defects using a free flap (green arrow) and local tissues from the parietal area (white arrow). Note tissue defects in the forehead and superciliary areas (blue arrow). Forming a Filatov's pedicle in the left neck and submandibular area (red arrow).

Sixteen days thereafter, bony defects in the superciliary and forehead areas and nasal root and sidewall were closed with Filatov's pedicles (Fig. 10).

Case 2

Case 2 patient was a 66-year-old male who presented to the institute with the diagnosis of basal cell cancer of the left eyelid, orbit, and soft tissues of the forehead, parietal and temporal areas after he had been treated at a general cancer center near his place of residence (Fig. 11A). He underwent tumor resection followed by a free flap closure of the soft tissue defect. Since the tumor recurred in eight months, the "walking" Filatov's tubed pedicle was formed in the neck. Six weeks later, after the transfer of the pedicle, the patient received a radical resection of the recurrent tumor, and the soft tissue defect was closed with the pedicled flap (Fig. 12 A-B).

Case 3

Case 3 was a 23 year-old female patient with a history of orbital exenteration and deep X-ray therapy for retinoblastoma at 1.5 years of age in whose eye a Filatov's pedicle was used for the formation of eyelids and conjunctival sac. The tubed pedicle was formed in the anterior abdominal wall. Two weeks later, a step to the left hand was made, and two weeks thereafter, a step to the left temporal area was made. Finally, four weeks thereafter, the distal end of the pedicle was severed and anchored to the soft tissue of the nasal sidewall and inner corner of the eye (Figs 13 and 14).

Therefore, the Filatov's pedicle may be the option of choice in patients requiring closure of large tissue defects in the presence of inadequate tissue blood supply. The original method of plastic surgery for closure of tissue defects which was proposed by V.P. Filatov 110 years ago is still relevant.

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Disclosures

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Fig. 6. Formed Filatov's pedicle in the right submandibular area (white arrow).



Fig. 7. The first step of the Filatov's pedicle from the left submandibular area to the preauricular area (blue arrow).



Fig. 8. Steps of the Filatov's pedicle to the right (A) and to the left (B) (white arrows).



Fig. 9. Partial right orbital exenteration, resection of the nasal root and excision of the nasal sidewall tumor with preservation of the eye and closure of soft tissue defects using the Filatov's pedicle (blue arrow)



Fig. 10. The final status after closure of bony defects in inner corner of the eye (red arrow), in the forehead and superciliary areas (blue area), and nasal root and sidewall (green arrow) using the Filatov's pedicle