8 Ex- and Enophthalmos: Case Reports

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Learning Objectives

- Effect of sinus pathology on change of orbital floor position.
- Absence of direct relationship between slowly progressive change of bony orbital volume and anterior–posterior position of the globe.
- A normal globe position, a degree of enophthalmos or exophthalmos does no inform you in a reliable way of underlying changes of bony orbital volume.

Case Report 1. Enophthalmos

An otherwise healthy 60-year female patient is known with a longstanding persisting sinus pathology. Thereby, she is dissatisfied about the position of her right eye, which is in her perception located downward and backward compared to the opposite site (Figs. 8.1, 8.2, 8.3, 8.4, and 8.5a, b).

Fig. 8.1 Patient with silent sinus syndrome right antrum: primary gaze

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Fig. 8.2 Patient with silent sinus syndrome right antrum: adduction

Fig. 8.3 Patient with silent sinus syndrome right antrum: abduction

Fig. 8.4 Patient with silent sinus syndrome right antrum: limited upward gaze

Because of the extensive and longstanding maxillary sinus pathology, the patient is well known at the ENT Department. Based on the CT's complete obliteration of the infundibulum in combination with a complete sloughing of the remaining maxillary sinus the ENT surgeon suggested a negative sinus pressure which had resulted in a collapse of the maxillary sinus, obvious enlargement of the bony orbital volume as a result of downward displacement of the orbital floor with subsequent hypoglobus and enophthalmos (Figs. 8.6 and 8.7). Based on these findings, a diagnosis of "silent sinus syndrome" was made. This maxillary sinus disease resulted in obvious facial asymmetry.

Clinical examination demonstrated a Hertel of 15/18 mm; also, hypoglobus was confirmed. Because of the deviated position of the left eye in a vertical, horizontal, and A-P direction, subsequent diplopia had developed, most profound in extreme upward gaze. Treatment proposal consisted of a combined ENT & Maxillofacial Surgery approach to correct the negative pressure by a wide infundibulotomy and aeration of the sinus. After the ENT procedure was carried out, aeration of the sinus was established; however, no repositioning of the orbital floor occurred, most likely

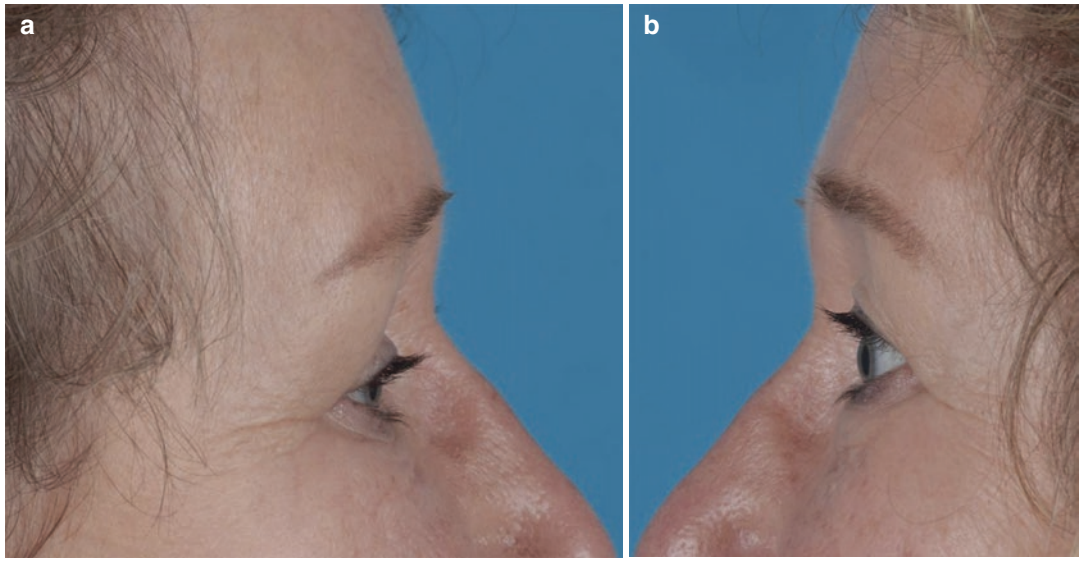

Fig. 8.5 (**a**) Patient with silent sinus syndrome right antrum: lateral view OD. (**b**) Patient with silent sinus syndrome right antrum: lateral view OS

Fig. 8.6 Patient with silent sinus syndrome right antrum: enlarged orbital volume OD, obliteration infundibulum: CT scan: coronal view

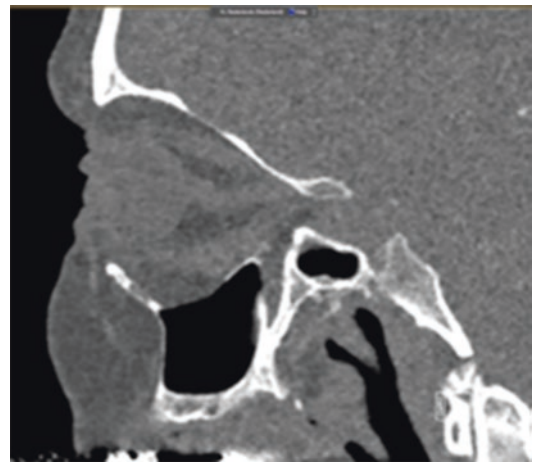

Fig. 8.7 Patient with silent sinus syndrome right antrum: CT scan: sagittal view

due to the already longstanding sinus pathology present. In fact, there was no spontaneous visible effect on the abnormal position of the eye.

Contemplation

As the silent sinus syndrome was present for a long period of time with a significant dislocation of the globe, fibrosis of orbital soft tissue may have occurred. In our opinion, caution is advised not to put too much (acute) tension on the apical orbital soft tissue, i.e., the optic nerve when repositioning the globe as this may cause unfortunate side effects on the neural or neurovascular tissue. We have had a few cases with temporary or persisting loss of vision when repositioning the globe to its former position. In this case, the patient preferred to wait and postpone the surgical repositioning of the globe because of the risks involved of worsening of double vision and/or potential blindness.

Case Report 2. Mild Hyperglobus

This 70-year-old female patient presented with signs and symptoms of recurrent sinusitis and a slowly progressive swelling of the left side of the face.

Clinical examination (Figs. 8.8, 8.9, 8.10, and 8.11) showed a diffuse swelling of the left side of the face including the adjacent lower eyelid; an intact function of NV and NVII was confirmed. There was no diplopia. Hertel measured 15/15 mm. A mild hyperglobus OS was present. Vision was not abnormal.

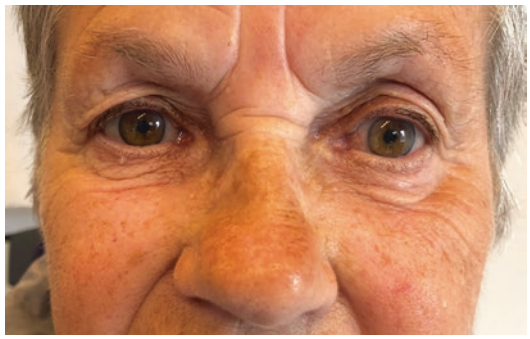

Fig. 8.8 Patient with keratocyst in left antrum: primary gaze, mild hyperglobus OS

Fig. 8.9 Patient with keratocyst in left antrum: lateral view OD

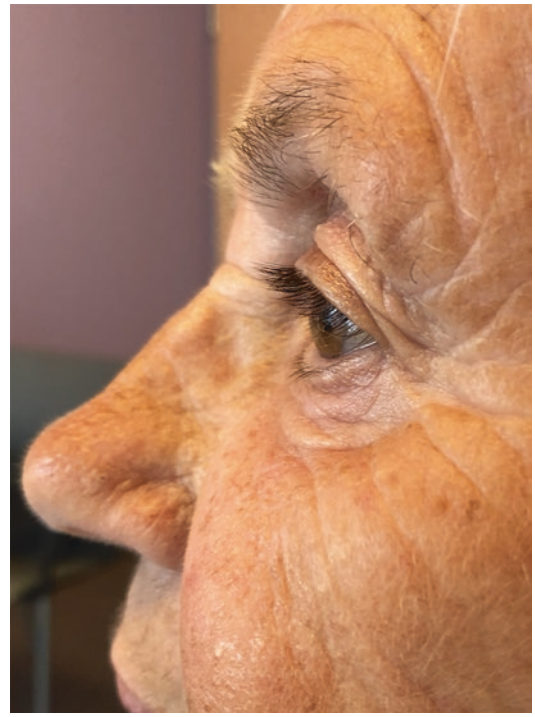

Fig. 8.10 Patient with keratocyst in left antrum: lateral view OS, no exophthalmos present

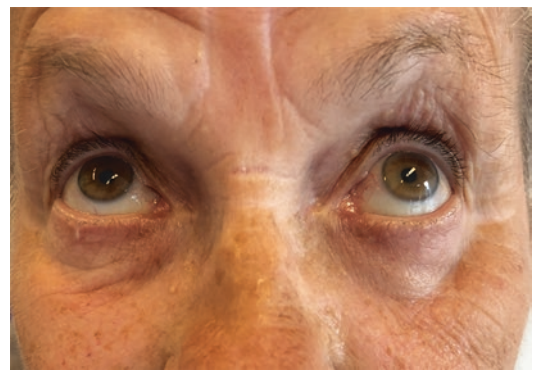

Fig. 8.11 Patient with keratocyst in left antrum: upward gaze, no limitation

Intraoral examination showed an elapsed, swollen maxillary vestibule including fluctuation on palpation.

The radiological exam exhibited an extensive cyst-type lesion encompassing the whole left maxillary sinus including orbital floor elevation

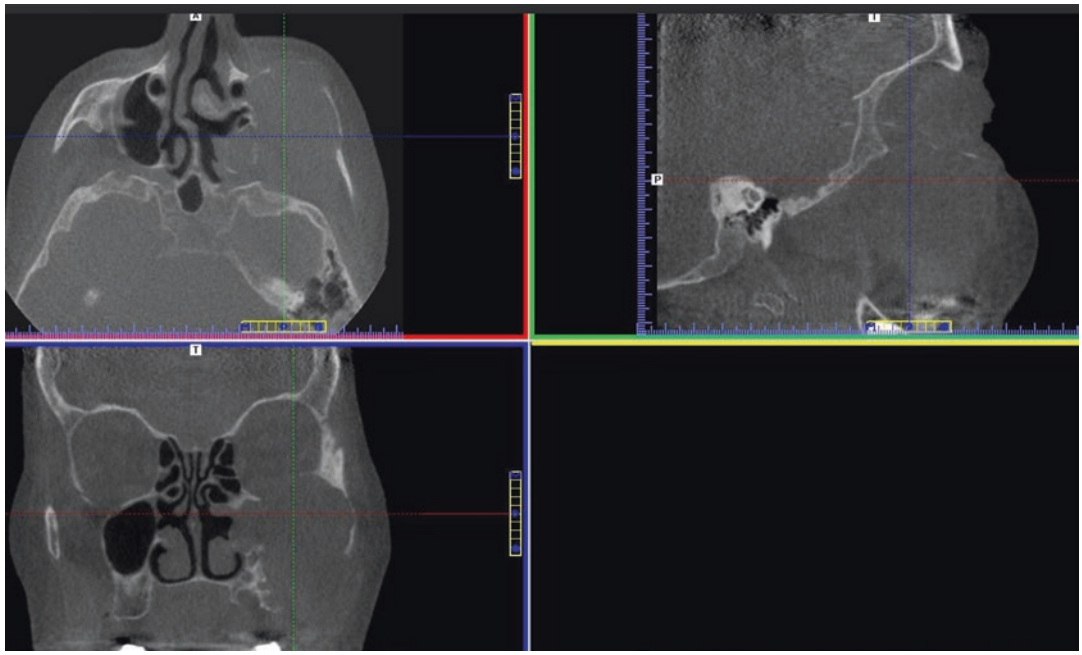

Fig. 8.12 Patient with keratocyst in left antrum: preoperative CT scan: large cystic process with destruction anterior and lateral wall maxilla; elevation orbital floor: corresponding axial, coronal and sagittal view

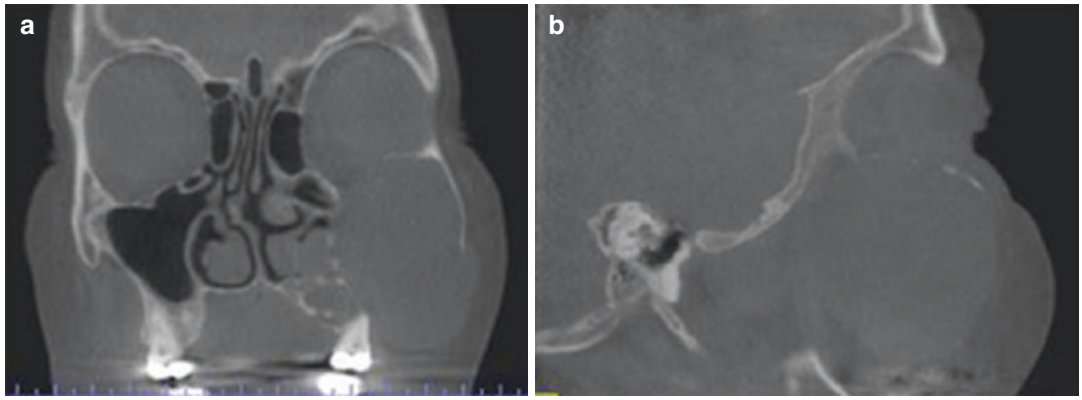

Fig. 8.13 (**a**) Patient with keratocyst in left antrum: preoperative CT scan: large cystic lesion maxilla, destruction lateral wall maxilla, orbital floor elevation; coronal view. (**b**) Patient with keratocyst in left antrum: preoperative CT scan: Large expanding cystic lesion maxilla with destruction anterior boundary, orbital floor elevation: sagittal view

which resulted in a decrease of the bony orbital volume (Figs. 8.12 and 8.13a, b). On the CT scan, sinus dehiscence due to extensive bony erosion of the anterior and lateral sinus wall as well as partial obliteration of the nasal pathway is diagnosed (Figs. 8.12 and 8.13a). A biopsy was taken: the diagnosis expanding keratocyst in maxillary sinus with orbital floor elevation as a result of the expanding character of the growing cyst.

Treatment consisted of wide exploration via an intraoral route leaving drains in situ to allow for long-term drainage and carry out thorough

Fig. 8.14 Patient with keratocyst in left antrum: postoperative CT scan: persistent cloudy sinus aspect, persistent orbital floor elevation; normalization nasal pathway: coronal view

rinsing of the maxillary cavity. Although the keratocyst treatment was successful so far, cyst excochleation did not result in normalization of the sinus configuration nor of the orbital floor position (Fig. 8.14).

Contemplation

It was interesting to note that, despite the extensive orbital floor elevation and subsequent reduction of orbital bony volume, no proptosis/exophthalmos developed. Apparently, there is sufficient intrinsic capacity of adaptation of orbital soft tissue to cope with slowly progressive bony orbital volume decrease so to minimize exophthalmos to occur. Only a slight hyperglobus was diagnosed. Ultimately, globe displacement was less than one would expect on the basis of orbital bony volume change, i.e., reduction.

Case Report 3. Exophthalmos

A 22-year-old ASA I female patient presented to the Oral and Maxillofacial Clinic with complaints of a slowly progressive swelling of the upper jaw

Fig. 8.15 Patient with follicular cyst in right antrum: primary gaze; exophthalmos OD

vestibule on the right side. There was no history of tooth complaints. No recent dental treatment. She also mentioned associated complaints of progressive impairment of air passage through the right side of the nose.

There was no double vision.

Clinical examination showed a very mild buccal swelling of the right side of the face. Asymmetry in globe position, Hertel 19/17 (Fig. 8.15). No diplopia present. Nasal examination showed a deviation of the right lateral nasal wall medially, obliterating the nasal pathway.

Intraoral examination showed a well-maintained "complete" dentition. There was a swollen upper right vestibule, tendency to fluctuation as if the lateral maxillary bony boundary was vanished.

Radiological exam: a CT-scan was obtained: findings: large cyst-type lesion almost completely obliterating the maxillary sinus on the right side including an impacted third maxillary molar which was located high in the cyst in proximity to the orbital floor. There is associated orbital floor elevation (Figs. 8.16 and 8.17). Also, the cyst is expanding medially into the nasal cavity, hereby reducing the nasal passage on the ipsilateral side.

Diagnosis "expanding large follicular cyst related to right-sided impacted third maxillary molar." Associated findings were apparent orbital floor elevation and reduction of nasal passage due

to the expanding character of the cyst.Treatment consisted of cyst excochleation and third molar removal via an intraoral approach. The surgical intervention and early follow-up was uneventful.

Two years follow-up showed that there was a good recovery of right-sided airway passage. There was no change in the slight exophthalmos on the affected right side although the orbital floor returned nearly completely to its original position as shown on the postoperative CT scan (Fig. 8.18).

Despite the persistent slight disfiguring eye asymmetry, the patient was satisfied with the end result. There were no complaints of double vision; diplopia was not diagnosed. Minimal asymmetry in Hertel was diagnosed, 19/17 as was diagnosed prior to the cyst development and according to the patient had been present over many years already. As such, there was no desire on the part of the patient to have the existing asymmetry corrected. More so, since orbital floor reconstruction may result in diplopia, refractory to correct.

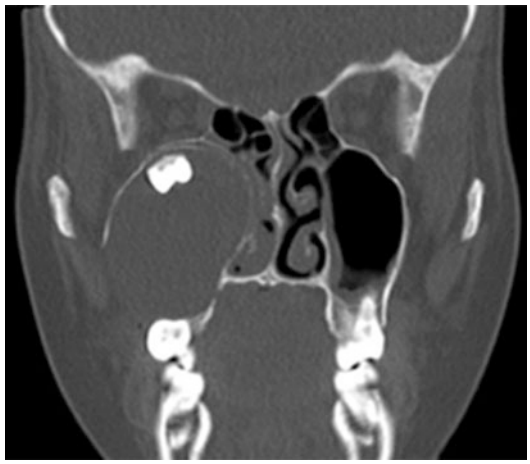

Fig. 8.16 Patient with follicular cyst in right antrum: preoperative CT scan: High positioned impacted third maxillary molar: coronal view

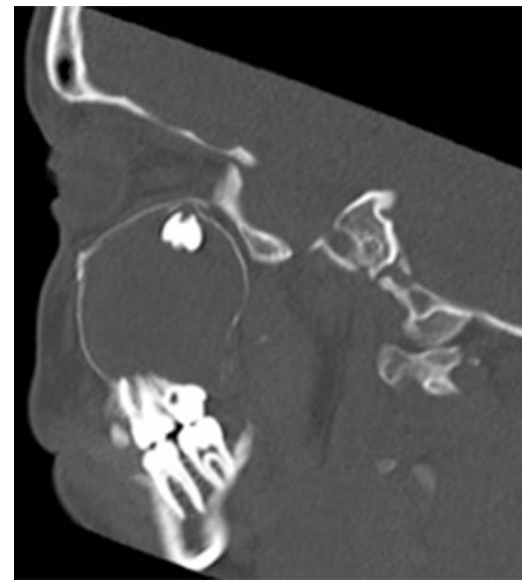

Fig. 8.17 Patient with follicular cyst in right antrum: preoperative CT scan: High impacted maxillary third molar, close to orbital floor: sagittal view

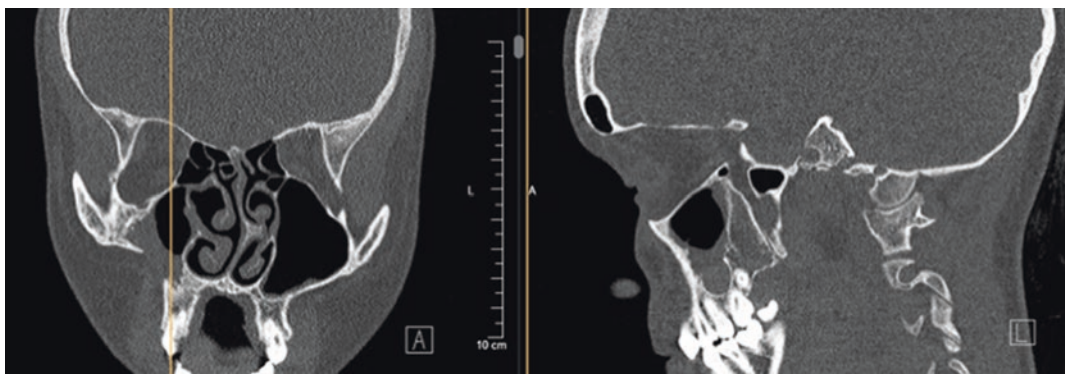

Fig. 8.18 Patient with follicular cyst in right antrum: postoperative CT scan: return of orbital floor to its original position: coronal and associated sagittal view

Contemplation

In this patient, despite the reduction of the bony orbital volume, especially in the apical area, no proptosis/exophthalmos developed; double vision was not reported. This is another example that apparently, orbital soft tissue is capable of adaptation to slowly progressive changes in its surrounding bony volume.

After successful surgical treatment, a nearly complete normalization of the orbital floor to its original position occurred.

Case Report 4. Exophthalmos

An otherwise healthy 10-year-old boy presents to our clinic with mild complaints of a slowly progressing swelling of the left side of the face. There is no associated pain, no tooth-ache in the history. No recent dental treatment. No history of recent trauma. The patient does not complain about eye-related problems.

Extraoral physical examination shows a mild-moderately firm buccal swelling of the left side of the face, no fluctuation, there is no tenderness. The function NV and NVII is intact. Normal vision, no diplopia; however, a slight exoforia OS. Hertel 18/18, no exophthalmos present (Figs. 8.19, 8.20, 8.21, and 8.22).

Intraoral examination showed a well-maintained mixed dentition; firm maxillary vestibular swelling on the left side (Fig. 8.23). No fistula, no fluctuation. In the radiological examination, the orthopantomogram revealed a downward oblique displacement of both bicuspids in the second quadrant as well as an associated cystic type lesion of the left side maxilla (Fig. 8.24).

The additional obtained CT-scan showed an "impacted" second bicuspid in the left side of the maxilla; also a large well-delineated cystic lesion on the left side of the maxilla with almost complete obliteration of the adjacent maxillary sinus and impressive orbital floor elevation OS. This in combination with obliteration of the ipsilateral infundibulum nasi (Figs. 8.25, 8.26, and 8.27).

Diagnosis: "infectious cystic lesion related to impacted bicuspid."

Fig. 8.19 Patient with infectious follicular cyst left antrum: primary gaze

Fig. 8.20 Patient with infectious follicular cyst left antrum: cranial view

Treatment consisted of cyst excochleation and removal of the suspected bicuspid via an intraoral vestibular approach. A limited infundibulotomy was carried out by our ENT colleagues. The follow-up showed an uneventful recovery. Postoperative radiological examination showed a more upright position of the first maxillary left

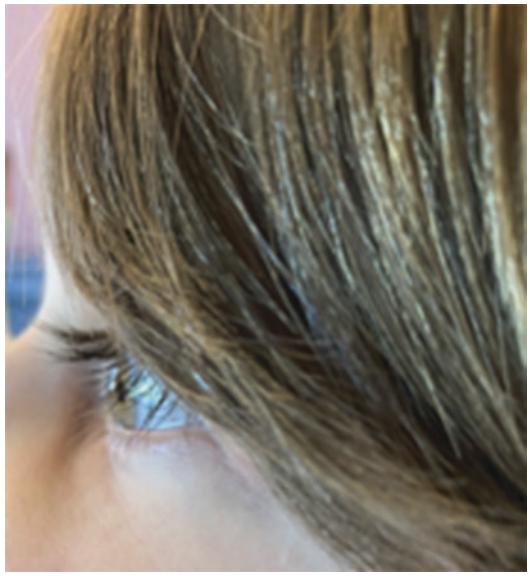

Fig. 8.21 Patient with infectious follicular cyst left antrum: left lateral view

Fig. 8.22 Patient with infectious follicular cyst left antrum: right lateral view

bicuspid and normalization of the orbital floor position and recovery of the maxillary sinus volume; in addition, reactive bone apposition is seen in the antral floor and caudal in the medial and lateral wall of the maxillary sinus (Figs. 8.28, 8.29, and 8.30).

Fig. 8.23 Patient with infectious follicular cyst left antrum: intraoral vestibulum, left upper side

Fig. 8.24 Patient with infectious follicular cyst left antrum: horizontally impacted left maxillary bicuspid: preoperative orthopantomogram

Fig. 8.25 Patient with infectious follicular cyst left antrum: preoperative CT scan: large cyst left maxillary sinus including orbital floor elevation OS: coronal view

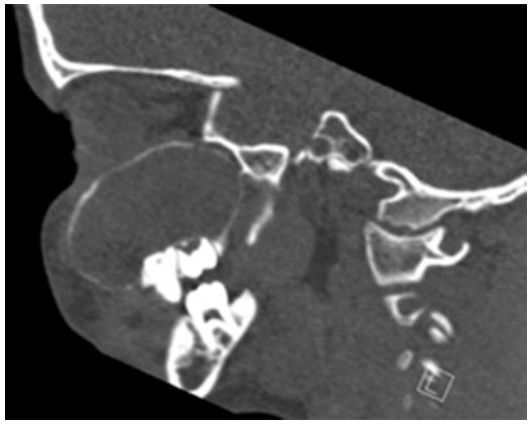

Fig. 8.26 Patient with infectious follicular cyst left antrum: preoperative CT scan: large cyst left maxillary sinus including orbital floor elevation: sagittal view

Fig. 8.27 Patient with infectious follicular cyst left antrum: preoperative CT scan: large left maxillary cyst expanding anteriorly: axial view

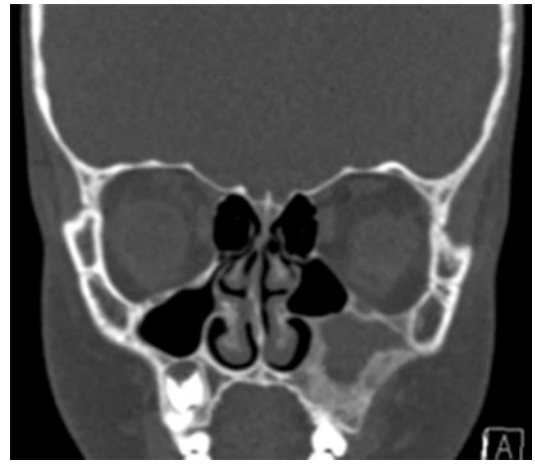

Fig. 8.28 Patient with infectious follicular cyst left antrum: normalization upright position first left maxillary bicuspid: postoperative orthopantomogram

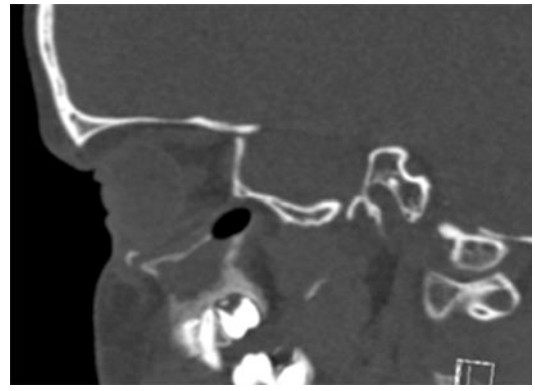

Fig. 8.29 Patient with infectious follicular cyst left antrum: postoperative CT scan: left orbital floor returned to its original position; bone apposition left maxillary sinus walls and floor: coronal view

Fig. 8.30 Patient with infectious follicular cyst left antrum: postoperative CT scan: left orbital floor returned to its original position: sagittal view

Contemplation

A large cystic lesion within the maxillary sinus resulted in an impressive elevation of the adjacent orbital floor (Figs. 8.24 and 8.25). However, this narrowing of the orbital bony volume did not result in an outward displacement, proptosis/exophthalmos of the globe. We assume that, because of the slowly progressing pathologic process, the soft tissue of the orbit adapts to its new changing volume, a physiological response to a pathological change.

Also, the orbital floor, which was displaced cranially by the expanding cystic lesion, returned to its pre-pathologic, symmetric position after excochleation of the maxillary cyst with the corresponding adaptive orbital soft tissue changes: no positional changes of the globe were diagnosed during the entire pathologic process, treatment, and post treatment period (Figs. 8.28 and 8.29). We assume, especially in younger children, adaptive changes are capable to adequately cope with volume changes: patient did not report double vision, no exophthalmos did occur.

Annotation

It is interesting to note that, when comparing the radiographic changes in orbital floor position before and after the treatment of the cystic lesion in the maxillary sinus that in the elderly patients the abnormal, displaced position of the orbital floor did not return to its original position while in the younger patient, there is an almost complete return to symmetrical orbital floor position. As can be expected, the younger patients have a higher degree of intrinsic recovery capacity.