The Gonial Angle Stripper: Clinical Application for Mandibular Angle Osteotomy

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INTRODUCTION
A prominent gonial angle, so called benign masseteric hypertrophy, is rather common and considered to be unattractive feature in the Orient. A face with this kind of deformity can only be corrected surgically. Though most of the procedures are performed intraorally, exposure of the operation site is often not large enough for osteoplasty to proceed safely. Since the definite indication of the site of osteotomy is needed, especially in a narrower operative field, a special instrument was devised to perform safe and accurate mandibular angle osteotomy.

OPERATIVE PROCEDURE
Surgical treatment of a prominent gonial angle is completed intraorally via gingival sulcus incision. The masseteric muscle in the lateral mandible area is detached with a periosteal elevator through the anterior edge of the muscle to the gonial angle. Muscle attachment at the gonion is usually very tough, and complete dissection of this area is necessary. The oblique line of the mandible body (Fig. 1a), which is the anterior border of the masseter muscle and is irregularly bulged in this kind of deformity, is shaved with a contouring burr to see the gonion more clearly (Fig. 1b). However, operative field is still limited in most cases so that the new instrument is applied for safe and accurate osteotomy. Gonial angle resection is performed with a small contouring burr creating a groove for osteotomy, and a small right angle saw and osteotomes are used to cut the bone (Fig. 1c). Additional mandibular marginal contouring or multistaged small piece ostectomy is done so as to obtain a natural and smooth mandible edge. The muscles are usually not resected.

INSTRUMENT
The 'Gonial angle stripper' was devised especially for gonial reduction ostectomy because the operative field for this procedure is still limited, even after shaving of the oblique line and surrounding tissue are fully retracted. In particular, a posteriorly developed gonial angle is hard to expose and is difficult to estimate and draw the line of osteotomy. The instrument has a small projection which is created on the haft 15mm from the tip, and it will ease identification of the ostectomy line on which most Japanese patients' jaws are cut. When the ostectomy is performed, the stripper is hooked on to the gonion, and the projection will show the line to be cut (Fig. 3). Inclination of the line can be variable with appropriate handling of the stripper. The projection of the instrument is groove-shaped perpendicular to the haft on which the contouring burr may be slide.
Fig. 1 Surgical treatment of a prominent gonial angle: the oblique line of the mandible body is shaved prior to osteotomy.

Fig. 2 The 'gonial angle stripper' has a small projection, which helps to determine the line of gonial angle ostectomy in a narrower operative field.
Fig. 3 Prior to the osteotomy, the 'gonial angle stripper' is hooked on to the gonion so that the projection on the tool will indicate the line to cut.

Fig. 4 The widths of resected bone in 9 earlier cases were 15 to 20mm.

Fig. 5 Exposure of the operation site via a gingival sulcular incision; the gonion can not be seen (a). After shaving oblique line; the gonion is appeared in the limited field (b). Application of the tool; the projection on the instrument indicates the line of osteotomy (c).
According to anthropological studies, Japanese mandibular plane angle averages 125.2°, and the distance between K-line and gonion is approximately 15 mm. Above. Nine earlier cases had been done without the instrument; the widths of resected bone were 15 to 20 mm (Fig. 4), which consequently led us to take the distance 15 mm for a projection of the tool. The instrument has been applied to 7 later cases (Fig. 5, 6). The outcomes of all the cases have been uneventful.

**DISCUSSION**

Recently, aesthetic facial skeletal contouring has become more frequently requested, and we have had more patients hoping to reduce unattractive facial highlights. In the Orient, a prominent gonial angle, so-called benign masseteric hypertrophy, is rather common and considered to be unattractive since it gives a more flat and stronger impression. It seems to be uncommon in the Western world where even implants for gonial augmentation are commercialized, but gonial angle reduction is one of the most popular types of facial skeletal contouring in the Orient). The treatment is mostly done for cosmetic reason. We perform surgery via the oral cavity. Reduction is usually done on the bony part instead of muscle excision because (1) most cases are affected with hyperostosis in gonial area, (2) muscle resection is not physiologically possible. Fig. 7 The ‘K-line’ is utilized for safe ostectomy. According to anthropological studies, Japanese mandibular plane angle averages 125.2°, and the distance between K-line and gonion is approximately 15 mm.
siological, (3) intraoperative evaluation of symmetrical muscle reduction is not so easy, and (4) there are possibilities of facial swelling due to bleeding or marginal branch injury. We do not have a very strict protocol for the surgery, but sufficient discussion with each patient, considering total face balance and cephalometric assessment is preoperatively done. When the osteotomy is done, K-line (Kamiishi, 1987) is utilized to identify the safety zone (Fig. 7). According to anthropological studies, the Japanese mandibular plane angle is approximately 125°, and the width of the K-line's safety zone is around 15mm. In our 9 early cases, the amount of resected bone was no less than 15mm. We devised the 'gonial angle stripper' as an indicator of the osteotomy line especially for cases of posteriorly developed prominent gonial angle, and its projection is created on the tool 15mm from the tip. We applied it in 7 later cases and it has been certified that the 'gonial angle stripper' provides highly effective guidance for the surgery of prominent gonial angle.

**SUMMARY**

A 'gonial angle stripper' was invented and clinically applied for the purpose of accurate and safe osteotomy of the mandibular angle area. Its usefulness, especially for posteriorly developed mandibular angle, has been proven.

**REFERENCES**


