Introduction

Fusion between the C1 and C2 vertebrae due to instability and dislocation has traditionally been performed with the Gallie [4] or the Brooks and Jenkins [1] methods using wire or cable fixation. Both these methods depend on bone blocks put in compression between the C1 arch and the C2 lamina. A new C1-C2 fixation device, the C1 claw device, has been developed, which establishes a rigid fixation between C1 and C2 without the need for bone blocks in compression. With the introduction of this new claw principle for C1 and C2 fixation, anterior dissection of the C1 arch can be avoided and the grafting can be made with bone chips alone. Both these advantages facilitate the surgery. This new method is of special benefit in cases with defects in the C1 arch, as is illustrated by this case report.

The new implant

The implant is made up of two counter-positioned hooks forming a claw that grips the C1 arch firmly. The shaft of the device consists of two semicircular profiles that together make up a 3.5-mm rod. This claw shaft can be connected to a transarticular screw, thus forming a rigid implant that provides both anterior and posterior C1-C2 fixation in a constrained unit (Fig. 1).
The claw device is integrated with and constitutes a part of the existing Olerud Cervical Fixation System (Nordopedic AB, Uppsala, Sweden) for posterior cervical spine fixation [9].

Case report

A 55-year-old patient was readmitted to hospital because of a failed C1-C2 fusion. Three months earlier he had been operated with reduction and stabilization for myelopathy due to a forward slip of C1 on C2 secondary to an os odontoideum. The fusion had been stabilized with transarticular screws without adjuvant posterior fixation, because of the presence of a bifid spine at the C1 arch with central defect (Fig. 2).

Abundant cancellous bone graft had been deposited between the stumps of C1 and the arch and posterior process of C2. The initial clinical course had been favorable, but within a couple of months the patient had experienced upper cervical pain and return of myelopathic symptoms. Radiographic examination revealed a failure of the fusion. The transarticular screws were fractured at the joint level and the slip had recurred. Most of the bone graft was resorbed (Fig. 3).

At re-operation, the C1-C2 articulation was stabilized with the new device. The posterior parts of the transarticular screws were

Fig. 2 Axial computed tomographic (CT) image of C1. Note the central defect of the posterior arch of C1

Fig. 3 The initial attempt at C1-C2 fusion was performed with transarticular screws, but without adjuvant posterior fixation due to the bifid spine of C1. At 2 months, the screws had fractured at the facet joint and the fusion had failed

Fig. 4 The applied construct mounted on a saw bone. The transverse bar prevents the claws from dislocating into the defect of the C1 arch

Fig. 5 One-year radiograph revealing a good fusion healing in a reduced position