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Comment to: “Non-rigid immobilisation of odontoid fractures” by E. J. Müller et al.

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Few “facts” seem to be verified knowledge in the vast literature dealing with fractures of the odontoid.

In spite of the well-known superiority in healing of type III dens fractures, in some publications no distinction is made between the biomechanically and biologically different fracture types concerning treatment and its outcome.

A low rate of pseudarthrosis is reported only for type III fractures, depending on the type of conservative treatment. It may be true that the treatment algorithm for dens fractures is not resolved by evidence-based criteria, as White puts it. With non-operative treatment of type II fractures, the outcome of initial treatment with the halo vest is rated superior to treatment with other types of orthoses concerning union and alignment.

Predictors of non-union seem to be type II fractures, advanced age (over 65 years), angulation and displacement.

The highest rate of bony union in correct alignment and with minimal impairment of range of motion (ROM) is achieved by direct anterior screw fixation (union rate up to 93%). It must be admitted, however, that even in specialised centres, such results will only be obtained after a learning curve. In the hands of an experienced surgeon, however, the somewhat technically demanding procedure is of low risk and stress, even for elderly patients, provided clear visibility can be obtained with fluoroscopy in both

planes (a condition that is made easier in old toothless patients).

Collars, which sometimes provide insufficient pain control and/or stabilisation of the fragments, or the halo vest, with its inconvenience especially for the aged, are not as effective as direct screwing of the type II fracture, at least in the hands of more experienced surgeons.

The message of the foregoing article by Müller et al. is that decision making for non-rigid fixation with a collar or internal fixation can be done by assessing the primary “stability” of the fracture with flexion/extension radiographs or dynamic fluoroscopy and repeated controls after several days.

By excluding unstable fractures with more than 2 mm displacement on flexion/extension radiographs and a wider fracture gap and antero-posterior displacement over 5 mm, the authors present in 19 type II cases three stable pseudarthroses and two secondary instabilities, which needed internal fixation after 11 and 13 weeks respectively. These five non-unions represent a 26.3% rate of non-bony united fractures following non-rigid fixation. The fate of so-called “stable” pseudarthroses is unknown. In the literature there are many reports on late neural deterioration, but precise descriptions of the type of the lesion in each individual case or dates of the course (time of diagnosis, initial treatment, second accident, etc.) are missing in many cases.

This comment refers to the article which can be found at
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Many authors today consider a “stable” pseudarthrosis does not present an unacceptable danger for the patient, and does not require urgent posterior fusion.

On the other hand, function-preserving anterior screw fixation is effective only in the first weeks after the injury if reduction is still possible, and connective tissue has not invaded the fracture gap. In case of an unstable non-union, a transarticular C1/C2 screw fixation combined with a Galie or Brooks fusion becomes necessary, but this will result in a decreased ROM.

In 1999, in an article subtitled: “How dangerous is it not to stabilize a non-union of the dens?”, Blauth et al. proposed classifying non-unions into the following four types for a clearer indication:

1. Stable pseudarthrosis
2. “Stable” pseudarthrosis with major dislocation
3. Unstable pseudarthrosis
4. Posttraumatic os odontoideum

Of these, only unstable pseudarthrosis and os odontoideum require timely fusion. “Stable” non-unions, even with considerable dislocation (without neural deficit), should be X-ray controlled

for some time and, if they remain unchanged, controls depending on clinical symptoms may continue.

The authors of the foregoing article treated 20% of their patients after their own guidelines with a non-rigid Philadelphia or Miami collar. In 10% secondary internal fixation was required and in 15.7% a “stable” non-union with its somewhat unclear future was the outcome. Looking at these numbers, many surgeons, not only in Europe, think that primary anterior screw fixation is the standard treatment of today in experienced centres.