

Clinical and Experimental Forum

Nucleoscope

Instrumentarium for Endoscopy of the Intervertebral Disc Space

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Summary. Basing on preliminary endoscopic examinations to present the intervertebral disc interspace using a common arthroscope in operations performed for lumbar disc prolapses, a special endoscopic instrumentarium (nucleoscope Hausmann-Forst) was developed allowing detailed and riskless views into the intervertebral disc interspace.

Zusammenfassung. Nach Vorversuchen zur endoskopischen Darstellung des Bandscheibenzwischenraumes mit einem gängigen Arthroskop während Nukleotomien wurde ein spezielles Instrumentarium (Nukleoskop Hausmann-Forst) entwickelt, das ausagekräftig und risikolos intraoperativ die Begutachtung des Bandscheibenzwischenraumes erlaubt.

Introduction

Using the common surgical instrumentarium during operations performed for lumbar disc prolapses (nucleotomies) there is a risk that intradiscally located sequestra are not only completely removed but that they may also even be displaced forward or to the opposite pushing the fixation forceps deeper (Fig. 1).

Danger of lumbar disc prolapses recidivation is often based on incomplete removal of dorsal located degenerative parts of the anulus fibrosus as well as left loose sequestra.

Therefore, experiments were made to enable direct endoscopic examinations of the intervertebral disc interspace during operation performed for lumbar disc prolapses.

Preliminary experiments with a common arthroscope on cadavers and patients during nucleotomies demonstrated that the endoscopy of the intervertebral



Fig. 1. Anatomical illustration of a cross-section of intervertebral disc interspace with insertion of angled grasping forceps: Too deep insertion can lead to ventral or contralateral shift of sequestra or degenerated residue

disc interspace (nucleoscopy) is possible from the technical point of view and the operative risk is not increased. Furthermore, a quantitative statement can be given of the left material in the interspace.

Basing on these experiences a special nucleoscope was developed in cooperation with R. Wolf (Knittlingen, West Germany).

Nucleoscope

The nucleoscope Hausmann-Forst is consisting of (Fig. 2):

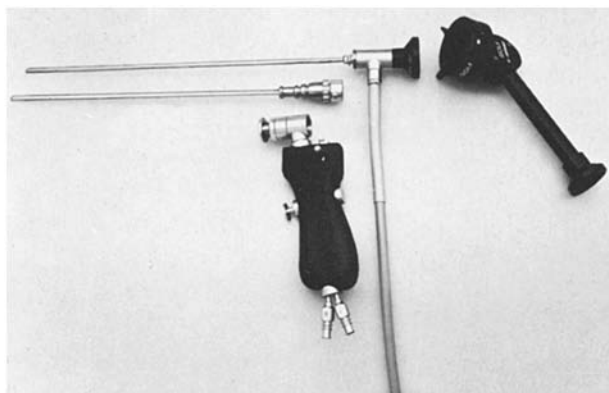


Fig. 2. Elements of the nucleoscope Hausmann-Forst: 1. Telescope with glass-fibre light transmission and 30 degrees angled telescope attachment; 2. Irrigation sheath with oval lumen; 3. Special handle with integrated single-hand aspiration-irrigation operation

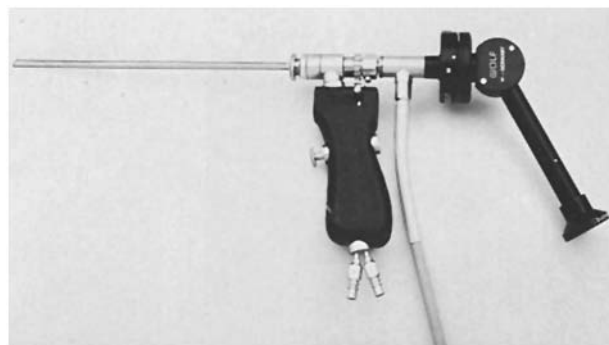


Fig. 3. Nucleoscope Hausmann-Forst, assembled and ready for use

1. Rigid 3.4 mm (\varnothing) telescope 30 degrees with built-in fibre light bundle, working length 250 mm.
2. 250 mm long suction-irrigation-sheath with an oval lumen and automatic lock for the coupling of the telescope and additional system for fixing of the special handle.



Fig. 4. Intraoperative use of the nucleoscope Hausmann-Forst with camera attached: 1. Irrigation fluid supply; 2. Suction drainage

3. Special handle with separate connection for irrigation and aspiration, single-handed. Sheath and telescope may be rotated completely.
4. Protractor eyepiece 30 degrees which may be rotated freely by 360 degrees.

Features and advantages of this nucleoscope (Fig. 3):

1. The combination of a 30 degrees lumina-SL-optic with the protractor eyepiece attachment freely rotatable by 360 degrees enables an unhindered field of vision in the intervertebral disc interspace around the longitudinal axis of the nucleoscope.
2. The protractor eyepiece attachment of 30 degrees ensures sterile examination with relaxed posture of the surgeon.

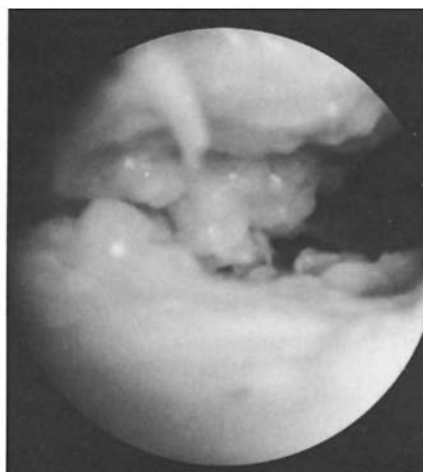
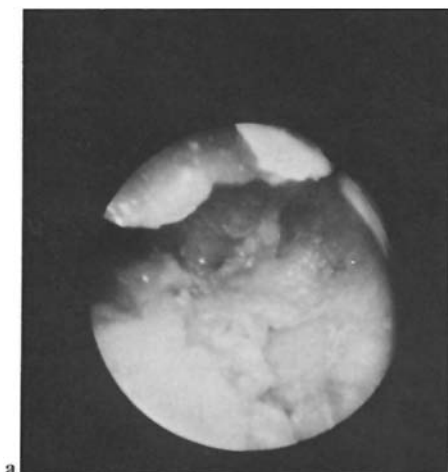


Fig. 5a and b. Nucleoscopic findings after nucleotomy. **a** Remaining degenerative residue in the intervertebral disc interspace. **b** Free floating sequestra in the intervertebral disc interspace

3. The special handle with separate connection for irrigation and aspiration and one-finger-operation of the slide valve ensures a clear field of vision in the intervertebral disc interspace at all times and provides safe control of the endoscope (Fig. 4).
4. In connection with the heavy duty light source (Wolf 5105), foto-film-tv documentation is no problem at all by means of the lumina-SL-telescope and their optimum resolving power.

Discussion

In the past endoscopic studies of the intervertebral disc interspace have been conducted by several work groups (Hausmann 1981; Hausmann and Ohnsorge 1982; Lennert 1982; Forst and Hausmann 1983; Suezewa et al. 1983).

Based on these findings a special nucleoscope was developed which takes into account the specific conditions of operations performed for lumbar disc prolapses.

The use of this nucleoscope during nucleotomies enables the direct recognition of sequestra and degenerate residues in the intervertebral disc inter-

space. This gives good reason to hope that the relapse frequency after lumbar intervertebral disc operations can be reduced.

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