MEDULLARY SPACE DRILL
5 Claims, 2 Drawing Figs.

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ABSTRACT: The invention relates to a medullary space drill including a flexible shaft carrying at its opposite ends respectively a drill head, and an adapter piece adapted to be connected for rotation with a driving means. The shaft comprises a plurality of parallel flexible elements arranged to provide a central passage for receiving an elongated guide element.
MEDULLARY SPACE DRILL

DISCLOSURE

Medullary space drills of this type are used for boring or widening the medullary space of bones in preparation of the insertion of a medullary peg. The medullary canal in the bone in general does not extend along a straight line, and insertion of the medullary space drill frequently can be effected only at a certain angle relative to the actual direction of the drilling operation. For this reason medullary space drills used for widening the medullary canal of bones are provided with a flexible shaft which enables the drill head, when penetrating into the medullary canal of the bone, to follow the extension of the medullary canal, and which furthermore allows displacement of the driving means for the drill under a certain angle relative to the extension of the bone, if necessary. In order to accommodate these circumstances, it is known to form the shaft of the medullary space drill from a pair of helics of resilient material in strip or wire form which helics are positioned one within the other.

However, medullary space drills of this type show the inherent disadvantage that they do not allow adequate cleaning thereof, because residues of blood and of other substances from the medullary space as well as bone fragments clog between the separate windings of the helics, between the helics, and within the shaft, and cannot be removed completely. As the medullary space drills are rendered sterile or autoclaved before every drilling operation, these residues are rendered sterile too; however, examinations of infections have shown that such residues nevertheless may be the cause for infections after operation.

Another disadvantage of the prior medullary space drills consists in that a twisting angle is formed between the drill head and the adapter piece for rotational connection with a drive shaft, which angle may be as great as 20°, and exhibits unfavorable effects in the course of the actual working operation. Due to the elasticity of their shafts such prior drills therefore tend to chatter, and this disturbs the operation. Thus, it is an object of the invention to provide an improved medullary space drill having a sufficiently flexible shaft, which may easily and completely be cleaned, which has substantial torsional rigidity, and which provides for smooth and uniform drilling operation even under maximum load.

According to the invention, these objects are solved by forming the shaft from a plurality of parallel, flexible individual elements.

Furthermore, advantageous embodiments of the subject matter of the invention consist in that the individual elements are disposed in an annular assembly, that such elements have circular cross section and that they may be welded or soldered to the drill head and the adapter piece for rotational connection to a drive shaft.

The invention is hereafter explained in greater detail in connection with an embodiment thereof, by means of the drawings, wherein:

FIG. 1 is a side elevational view of a medullary space drill according to the invention, and

FIG. 2 is a cross-sectional view taken along lines 2-2 of FIG. 1.

According to FIGS. 1 and 2, the flexible shaft 1 comprises a plurality of elongated, parallel, annularly disposed individual elements 2 of circular cross section, these elements being united at their ends to form a bundle, for example by welding or brazing. The number of elements 2 depends on the size of the drill. In a drill of 13 millimeters diameter, an annular arrangement of eight elements has proved to be expedient. One end of this bundle carries a drill head 3 being enlarged in the region of its cutting edges, whereas the other end supports an adapter piece 4 for rotational connection to a drive shaft. The adapter piece 4 may have a plurality of projections pressed out therefrom which projections are engaged, in known manner, by a union nut 6 adapted to provide the connection with a complementary adapter piece of a driving means. The outer diameter of the flexible shaft 1 preferably is slightly smaller than that of the adapter piece 4 and of that portion of the drill head 3 which does not have any cutting edges.

Furthermore, both the adapter piece 4 and the drill head 3 may be provided, in known manner, with a central bore or passage 7 having approximately the same inner diameter as the flexible shaft 1 formed by the bundle of annularly arranged elements 2, said bore or passage 7 being adapted to receive therein an elongated guide element (not shown).

I claim:

1. A medullary space drill including a flexible shaft carrying at its opposite ends respectively a drill head having an axial bore therethrough, and an adapter piece for connection to a drive shaft whereby said drill may be rotated, said adapter piece having an axial bore therethrough, at least a portion of said flexible shaft being formed of a plurality of parallel, flexible individual elements extending between said drill head and said adapter piece, said individual elements being arranged to provide a central passage which together with the bores in said drill head and adapter piece is adapted to receive an elongated guide element.

2. The medullary space drill according to claim 1, wherein said individual elements are positioned in an annular assembly.

3. The medullary space drill according to claim 1 wherein said individual elements have circular cross sections.

4. The medullary space drill according to claim 1 wherein said individual elements are welded to the drill head and to said adapter piece respectively.

5. The medullary space drill according to claim 1 wherein said individual elements are soldered to said drill head and said adapter piece respectively.