

**PAJUNK®**

*Lumbar Puncture with the  
SPROTTE® Cannula –  
For Safe Diagnostics*



Lumbar puncture

## Lumbar puncture with SPROTTE® cannula

# The Success Story of Lumbar Puncture

Since its introduction by H.I. Quincke in 1890, lumbar puncture has held a significant position in the field of neurological diagnostics. This is due to the absolute necessity for the extraction of cerebrospinal fluid and the measurement of cerebrospinal fluid pressure for differential diagnosis and follow-up monitoring of infections, inflammatory and tumorous diseases of the nervous system. Myelography, also an absolutely indispensable diagnostic procedure, requires puncture of the spinal dura. It maintains its position as a means of diagnostic investigation, primarily involving conditions where spinal space expansion or compression is concerned, despite the rapid growth and increasing refinement of

imaging methods used in diagnostics. The stature and appreciation which lumbar puncture enjoys from a medical viewpoint is, however, countered by a rather negative image within the general population. This attitude is based on the most feared consequential problems resulting from lumbar puncture:

- Post-puncture syndrome with severe position-related headaches accompanied by nausea and vomiting lasting for up to a week (with a Quincke cannula, incidence of 30-40 %).
- Low-frequency hearing loss and abducens nerve paresis (rare and mostly reversible)
- Subdural haematomas (sometimes can appear after a latency period of days/weeks without

## Lumbar puncture

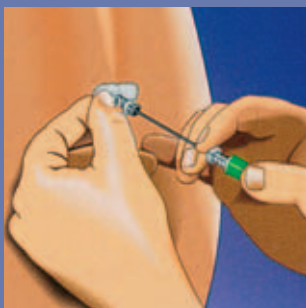
# The Atraumatic Puncture with the SPROTTE

The secret of this success is in the unique tip geometry and basic design of the SPROTTE® cannula which has been unequalled to this day. In comparison with other cannulas the original provides both patients and users alike with a considerably greater range of functionality, safety and reliability.

Alternative puncture technique



After administration of local anaesthesia using a fine cannula, the subcutaneous puncture is performed with a short, sharp introducer in the desired puncture direction.

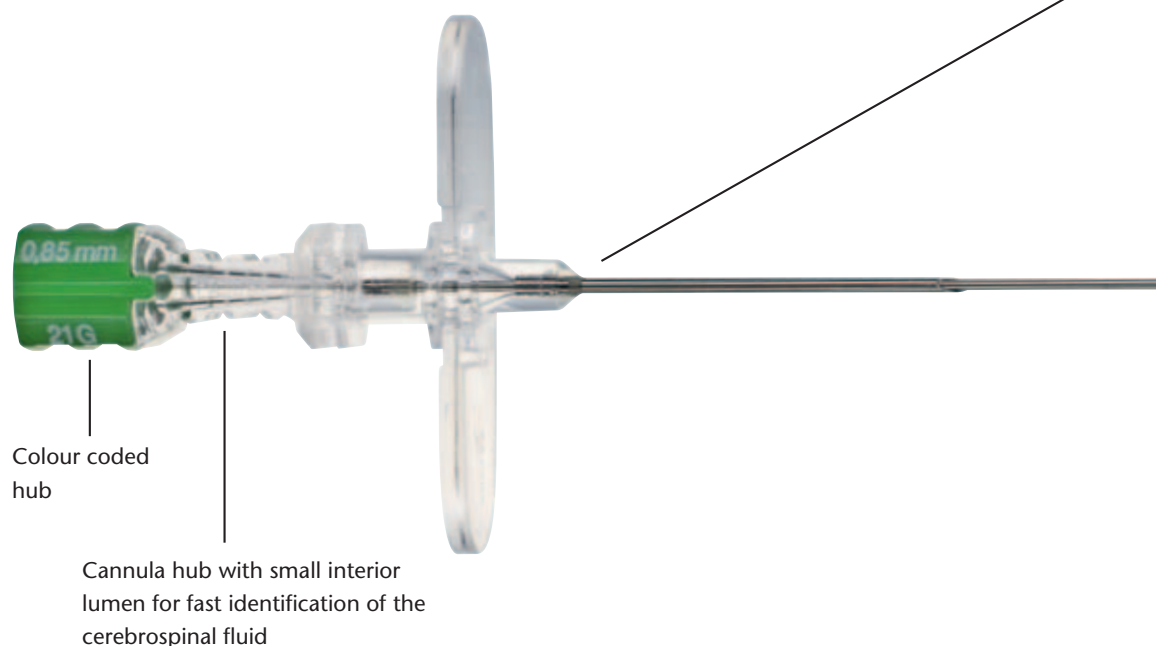


Introduction of the atraumatic cannula through the introducer cannula

20 G = 0.90 mm ■

21 G = 0.85 mm ■

22 G = 0.70 mm ■

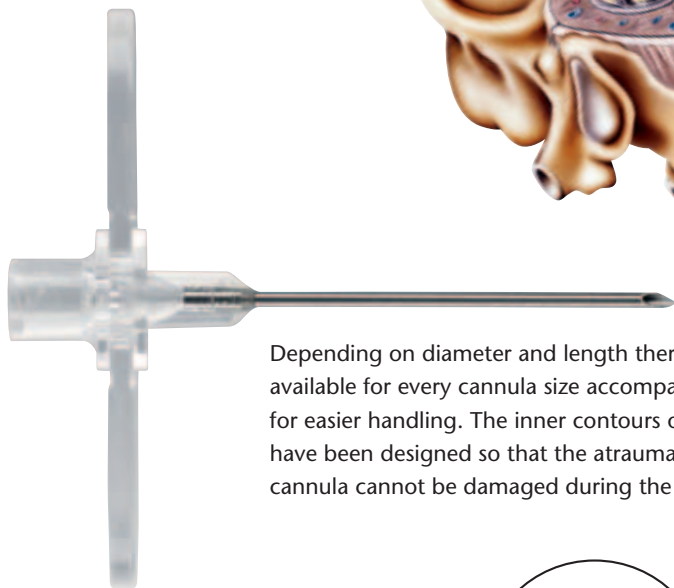
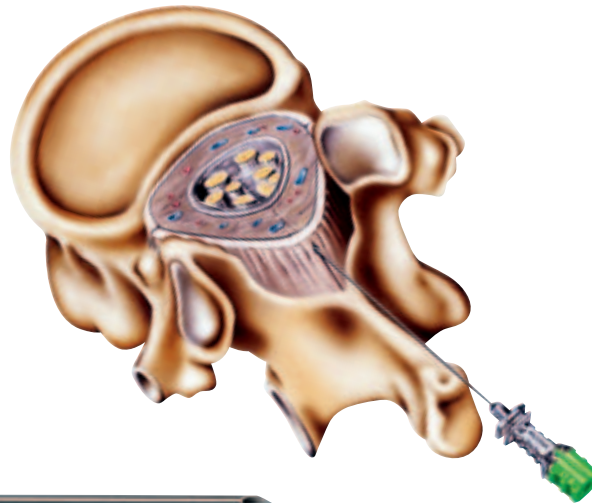


symptoms, but which can be, however, of serious consequence particularly in elderly patients despite their infrequent occurrence).

Knowledge of sequelae commonly occurring in association with lumbar puncture is wide-spread, and the consequential fears related to this method are – due to the experiences encountered in the past 100 years – embedded deep in the minds of people probably more than with every other diagnostic procedure. With the introduction of the SPROTTE® cannula 30 years ago, medicine reduced its fear in this highly sensitive field, as trauma inflicted on the dura and any potential unwanted consequences of this intervention were

reduced to a minimum. The regained confidence is appreciated and so highly regarded by scientists that the application of lumbar puncture to healthy subjects for research purposes has become ethically acceptable. So the atraumatic SPROTTE® cannula developed by Prof. Sprotte and PAJUNK® has been able to drastically lower the frequency, the duration and the severity of complications. In the past, patients had to undergo, on average, a week of hospital treatment following puncture whereas nowadays cerebrospinal fluid diagnostics and myelography can be performed on an out-patient basis.

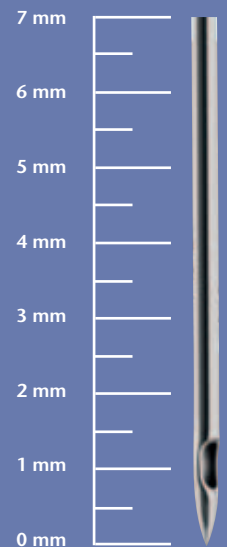
E®



Depending on diameter and length there is a specific introducer available for every cannula size accompanied by detachable plate for easier handling. The inner contours of the introducer hub have been designed so that the atraumatic tip of the SPROTTE® cannula cannot be damaged during the introduction process.



The ogive-shaped tip geometry provides the cannula with its atraumatic qualities.



The optimal solution for every application:  
A wide range of cannulas in different diameters and lengths accommodates the most exacting individual requirements. Special designs for paediatrics and SPROTTE® cannulas for overweight adults complete the range.

## The original SPROTTE® cannula

# The Guarantor in Atraumatic Puncture

The atraumatic puncture qualities of the SPROTTE® cannula have also been proven in experimental nerve lesions both by measurement of tissue action potentials and histologically (Literature: Hirasawa et al.):

### Ogive-shaped tip geometry

The closed tip of the cannula has the shape of an ogive. It displaces the tissue during the puncture process without injuring it. The multi-layered texture of the dura, consisting of collagens and elastic fibres will close again after the cannula is removed.



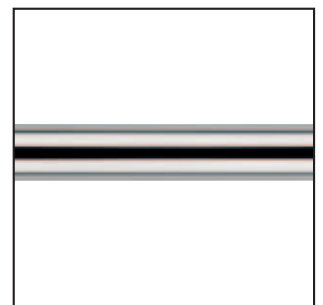
### Lateral eye with rounded edge

The lateral opening of the SPROTTE® cannula is completely free of burrs and has atraumatically rounded edges. This quality characteristic provides perfect and smooth gliding features and minimises coring of tissue into the subarachnoid space.



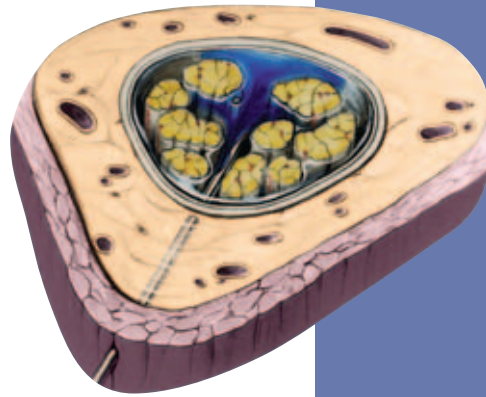
### Polished stainless steel surface

The cannula is manufactured from first-class stainless steel which guarantees optimal stability. The surface and the inner lumen have been polished which reduces any surface roughness to a minimum. This ensures that the SPROTTE® cannula can be positioned optimally to ensure CSF - reflux is optimised by the greatly reduced internal surface roughness.



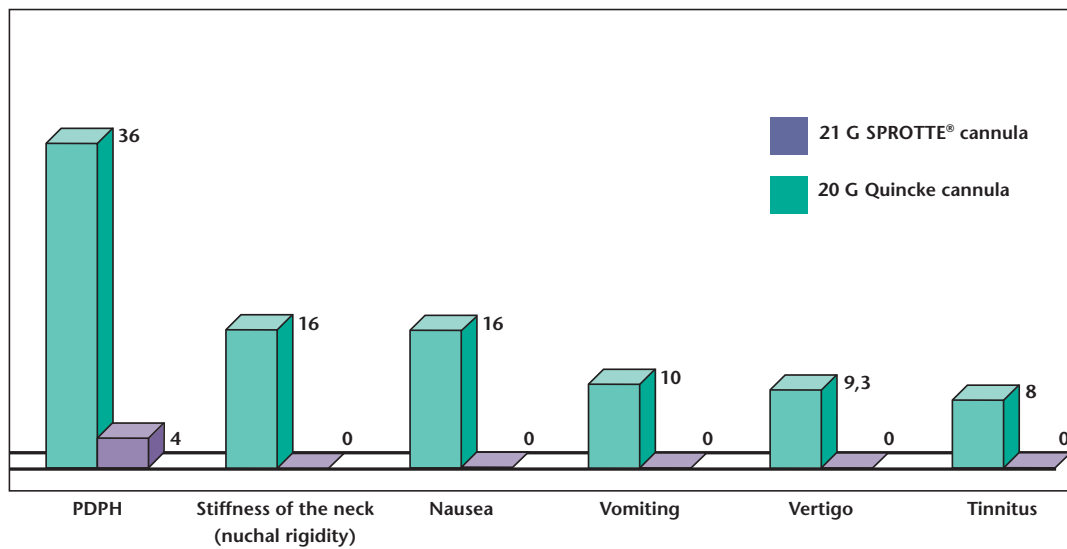
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**The effect is obvious:**

In comparison with conventional cannulas the post spinal headache rate occurring with an original SPROTTE® cannula is reduced by a factor of 10.



Evidence shows that post spinal headaches appear less frequent when the SPROTTE® cannula is used. (Results of the first controlled study - Jäger et al 1991 Akt. Neurol. 18: 61-64)

The use of atraumatic cannula will not only reduce post spinal headaches but, as has been proven, nuchal rigidity, nausea and vomiting can also be avoided. The recommendation to use atraumatic cannula can be justified from an economical point of view: the costs of medical treatment can be noticeably reduced by the prevention of unwanted side effects.

The reduction of post spinal headaches by using atraumatic cannulas is proven: Class I evidence, Type A recommendation (Neurology 2000; 55... 909-914); this is valid for all diameters of the atraumatic cannula in use, from 20 Gauge (Strupp et al Neurology 2001; 57:2310-2312) to 27 Gauge (Flaatten et al, Acta Anaesthesiol Scand 2000;44:643-644).

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*Safety through precision and cleanliness*

## ***Responsible Handling of Cerebrospinal Flu***

### **Free flow of cerebrospinal fluid**

In the measurement of cerebrospinal fluid pressure, the time elapsed between the puncture and the transduction of pressure is of critical significance. In this regard design and manufacture of the cannula have substantial influence in

the physical conditions determining the flow of cerebrospinal fluid. The period of time between puncturing the spinal space and the injection of anaesthetic is actually substantially reduced when using the SPROTTE® cannula:

### **Inner lumen of the cannula**

The smooth inner lumen of the cannula provides for maximum reduction in surface roughness. This allows optimal reflux of cerebrospinal fluid.



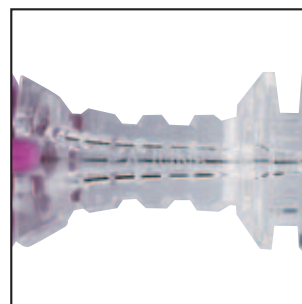
### **Lateral opening**

The lateral opening of the cannula directly behind the tip ensures an unhindered flow of cerebrospinal fluid even if the arachnoidea may be partially blocking the opening.

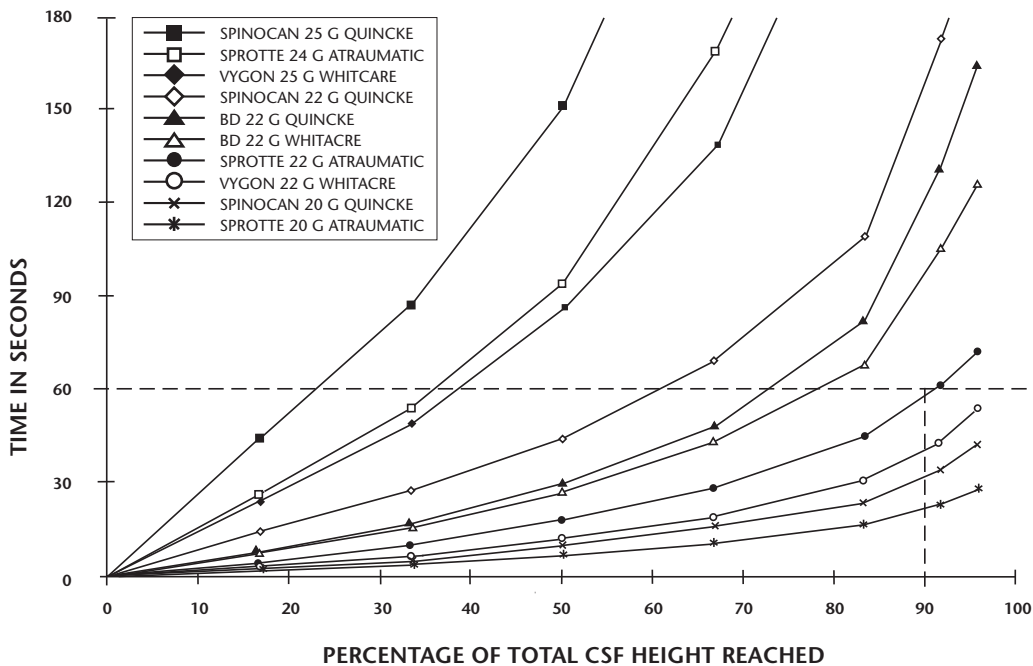


### **Optimal cannula hub**

The small interior lumen of the plastic hub fills quickly with cerebrospinal fluid allowing it to be identified faster.



## The Carson study



Pressure transduction of a simulated cerebrospinal fluid pressure of 24 cm passing through cannula of different manufacturers. According to Carson D.: Choosing the best cannula for diagnostic lumbar puncture Neurology 1996; 47:33-37

## Maximum cleanliness

An essential quality aspect and safety feature directly correlates with the need for cleanliness. PAJUNK® operates strict requirements here.

- A special multistage cleaning process guarantees an absolutely clean puncture when using the SPROTTE® cannula and simultaneously minimises the risk to the nervous system. Following the cleaning operation the SPROTTE® cannula is subjected to a special drying process.
- The outer surface, tip of the stylet and lateral eye of the SPROTTE® cannula are all polished extensively. The extremely smooth steel surface obtained by this process minimises the risk of any metal particle detachment and release into the cerebrospinal fluid. Any potential tissue and blood serum protein deposit is also avoided at this time. The latest equipment, comprehensive process control and extensive checks within the PAJUNK® clean room guarantees maximum cleanliness and therefore improved safety for the patient.



## Lumbar puncture

# All the information at a glance:

### SPROTTE® cannula for lumbar puncture

#### Without introducer and wings

Size	Item no.	PU
22 G x 90 mm	001151-30C	25
22 G x 103 mm	521151-30C	25
22 G x 120 mm	031151-30C	10
21 G x 90 mm	001151-31A	25
21 G x 120 mm	031151-31A	10
20 G x 90 mm	0001151-31	25

#### With introducer and wings

Size	Item no.	PU
22 G x 90 mm	321151-30C	25
22 G x 103 mm	341151-30C	25
22 G x 120 mm	331151-30C	25
21 G x 90 mm	321151-31A	25
21 G x 103 mm	341151-31A	25
21 G x 120 mm	331151-31A	25
20 G x 90 mm	331151-31B	25
20 G x 103 mm	341151-31B	25

#### Introducer for the SPROTTE® cannula

Size	Item no.	Cannula Size	PU
1.0 x 30 mm	001151-30L	22 G	25
1.1 x 30 mm	051151-30L	21 G	25
1.2 x 30 mm	061151-30L	20 G	25

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