

## THE FIRST PUBLISHED STAPES SURGERY BY JOHANNES KESSEL “THE FATHER OF STAPES SURGERY”

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### Abstract:

At the end of this year 2015 it will be 140 years ago that Johannes Kessel performed the first well-documented paper on stapes surgery. His paper is considered to be the start of stapes surgery at the end of the 19th century. Just recently another hero on stapes surgery John J. Shea Jr. passed away. Shea was impressed by the pioneer work of Kessel and he and later Anthony Jahn donated the name “The Father of stapes surgery” to Johannes Kessel. The life story of one of the greatest otologic surgeons of all time was one with ups and many downs. This present brief history on the early contribution of Kessel to the development of stapes surgery shows that he was ahead of his time which resulted in undeserved humiliation and defeat by his colleagues

### His early years

Johannes Kessel was born on 14 February 1839 in Selzen Hessen in Germany. He followed high school (Gymnasium) in Darmstadt and studied from 1857 till 1866 medicine at the university of Würzburg and



Fig.1  
Ernst Mach (1838-1916)

Giessen in Germany. In 1866 he graduated doctor medicinae and became assistant in the clinic of Anton von Tröltsch in Würzburg. His interest was mainly middle ear anatomy<sup>1</sup>. In the following years Kessel stayed in Vienna

to study otology by Adam Politzer in the Institut für allgemeine und experimentale pathologie. Then he moved to Prague where he worked together with the famous senses psychologist and physicist Ernst Mach (1838-1916) (Fig. 1) at the Karl - Ferdinands - Universität<sup>2</sup>.

They repeated the experimental animal studies performed by Marie Jean Pierre Flourens (1794-1867) from Paris by removing the middle ear bones in pigeons & dogs. Kessel and Mach published two papers together on the subject of the middle ear<sup>3,4</sup> and demonstrated that it was possible to remove the stapes without damaging or losing much of the hearing function. Mach and Kessel designed also an ear mirror (Fig. 2) to study the movements of the tympanic membrane and the function of the middle ear muscles as an accommodation system of the ear in humans<sup>4</sup>. Mach presented often scientific presentations at the University of Graz and in 1875 he probably introduced and nominated Kessel as “privatdozent” in otology over there.

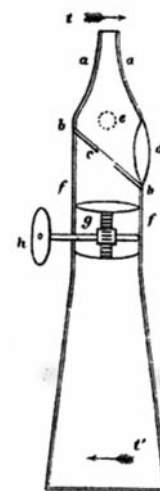


Fig.2  
Ear mirror designed  
by Mach & Kessel ma-  
nufactured by Mr Merz  
in August 1871

### The “first” stapes surgery published

On 27 March 1876 Johannes Kessel (fig.4) presented the case history of his first stapes mobilization in front of the doctors so-

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ciety of Graz followed by a publication in *Archiv für Ohrenheilkunde*<sup>5</sup> thereafter. Kessel opened his paper by claiming that he probably was the first to dissect the stapedial muscle. The redaction (von Tröltzsch, Schwartz and Politzer) of the journal delicately remarked that Prof. Lucae from Berlin performed this surgery already 10 years earlier. In his publication which can be considered to be the first original onset of stapes surgery (Fig.3) Kessel compared this type of surgery with

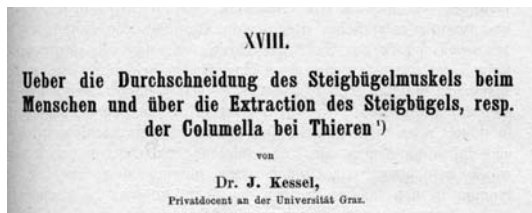


Fig.3  
Kessel's publication on stapes surgery

lens extraction in ophthalmology. Kessel discussed the theories of Breurer and Goltz about the pressure changes in the inner ear by perilymphatic leakage. Contraction of the stapes muscle could result in an intra labyrinth pressure change with tinnitus, vertigo and hearing loss. Furthermore Kessel described his experimental stapes extraction research on dogs from 1871 without mentioning the name of Ernst Mach. A conclusion of his experiments was that it must be possible to perform an operation upon the labyrinth to treat vertigo tinnitus and hearing loss and to influence the intra labyrinth pressure. After his scientific introduction Kessel presented his case report. The patient was Rosa H. a female of 23 years from Leibnitz near Graz who suffered hearing loss and otitis since her sixth year of age due to a scarlet fever infection. From July 1875 till December that year she suffered from recurrent ear infections with hearing loss and unbearable tinnitus. She begged Kessel for an operation to treat her tinnitus even when there was a risk for her life. By inspection of the ears Kessel noticed the disappearing of the tympanic membrane, the malleus and incus. The stapes was visible and by touching the stapes with a probe he discovered a fixation of the stapes. The patient experienced a loud tone during the manipulations on the stapes with the probe. Convinced that the fixated stapes produced an increased pressure of the labyrinth fluid Kessel decided to start to perform a mobilization of the stapes and if there

was no success of that treatment an extraction of the stapes was suggested. On December 21st 1875 the stapes mobilization was performed. To the surprise of the patient and the surgeon the hearing improved and the tinnitus diminished. In the follow-up time Kessel noticed that the stapes was moved by contraction of the musculus stapedius so he decided to cut the tendon of the muscle. The result was astonishing. The tinnitus was gone and the patient heard much better. The post-operative phase was featured by granulation formation around the mobilized stapes which was treated by local sodium chloride 1/2% solution. At the end of april 1876 the patient visited Kessel for the last time not suffering



Fig 4.  
Johannes Kessel in Graz

tinnitus and with better hearing. After this case report of the successful stapes mobilization with additional transection of the stapes muscle Kessel came with an explanation and an advice. Because of longtime mucosal pathology in the middle ear the tendons of the stapes and malleus became insufficient and lost their contractibility resulting in pressure changes in the inner ear. That explained the hearing loss and tinnitus. Kessel recommended transection of the tendons of tympanic membrane spanners as remedy to lower the

labyrinth pressure. In the last paragraph of his publication Kessel wrote that if the opportunity arises he would perform an extraction of the stapes and report about it in a following paper.

### Reactions on the publication

Kessel's paper was received with some skeptical reaction by his contemporaries. As mentioned by the redaction the journal August Lucae performed the surgery already ten years earlier. Furthermore the tenotomy of the tensor tympani was already in-

stapes mobilizations followed by Emile Boucheron also from Paris. In Germany Hermann Schwartz and August Lucae performed the stapes mobilizations and stapes extractions. While in Italy Emillio di Rossi and Guiseppe Faraci reported on their stapes surgeries. In the USA stapes extraction was introduced by Samuel Sexton, Charles Burnett, Clarence Blake and Albert Tuttle. Frederick Lafayette Jack (1861-1951) was a pupil of Blake of Boston and claimed very good results using the stapedectomy operations according to the technique of Kessel.

### From Graz to Jena

After the withdraw due to health problems of Friedrich Eugen Weber-Liel (1832-1891) as head of the department in the University of Jena in 1886 Johannes Kessel moved as successor from Graz to Jena. He continued the tenotomy work of Weber-Liel<sup>6</sup> and performed motivated by his initial enthusiasm many stapes extraction and mobilizations. From the start of his practice in Jena the number of ear surgeries increased from 27 in 1866 to 398 in 1899. Due to this growth of amount of patients the number of beds in the hospital increased from 17 to 40 in 1900. At the end of 1900 Kessel was able to open a new ear clinic in Jena. At the festive opening on the December 14th 1900 he presented a paper on the history of otology and the growing ear data of his ear clinic<sup>7</sup>. Despite of all initial enthusiasm of Kessel for the stapes surgery most of his colleagues otologists quit the surgery because the results were not long lasting.



Fig. 5  
Johannes Kessel in his later years as painted by his daughter

troduced by Friedrich Eugen Weber-Liel from Berlin in 1874. Another reaction came from Emillio di Rossi (1844-1902) from Rome claiming that he already performed stapes mobilization with sectioning of the tendon upon two patients in 1871.

Convinced by his results in some patients Kessel continued to perform stapes mobilizations and stapes extractions. The news of Kessel's "new" surgical treatment for hearing loss and tinnitus spread quickly through the relatively small medical community of Europe. Soon thereafter Camille Miot from Paris reported 200 cases of successful (66%)

### Fallen into disrepute

In the nineties of the 19th century a turn took place in the appreciation of the stapes surgery. Many leading otologists expressed their doubts on the value and success of stapes surgery. In 1894 on an international congress in Rome Vincenze Cozzolino and Adam Politzer stated that the results of stapes surgery were uncertain and not long lasting. An inevitable incident happened and was for example reported by August Lucae in a discussion with Adam Politzer on the 6th international Otology Congress in London 1899. During surgery a stapes luxation occurred in a healthy young man. Eighteen days postoperatively the patient developed lethal

meningitis. Leading otologists like Blake, Politzer, Siebenmann and Botey declared "Stapes surgery is useless, often mutilating, and dangerous."

Short after he opened his total renewed ear clinic in Jena Kessel (Fig.5) fell into disrepute by the condemnation of the stapedectomy which he introduced and had advocated since 1876. Was it jealousy or the character of Kessel which made his otological contemporaries accused publically him for unscrupulousness? Totally disappointed and embittered due to this accusations Kessel resigned his "Professor extraordinarius"<sup>9,10</sup>. Thereafter he worked unceasingly separated from the world and his friends in his ear clinic. After 1900 he did not published any paper on his results. According to a communication of his son Kessel worked in the last years on an unfinished book entitled: „Über das Gehörorgan und das Hören". Johannes Kessel died on 22 september 1907 at the age of 68 due to a mediastinal tumor. An obituary in *Archiv für Ohrenheilkunde*<sup>11</sup> eulogized the versatility of Kessel's work in particular his anatomical and physiological publications. His magnificent early contributions to middle ear surgery for which Kessel was far ahead of his time and for which he suffered undeserved humiliation and defeat by his colleagues were concealed in the obituary.

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