The Journal of Laryngology & Otology (2006), ***120***, *178–180.*

doi:10.1017/S0022215106000302
Printed in the United Kingdom

Historical Article

The bullet that hit a nerve: the history of Lucja Frey and her syndrome

Nicola Jacobsen, MA, MRCS (Eng & Ed), Claire Hopkins, FRCS (ORL-HNS)

Abstract

Duphenix first described gustatory sweating in 1757. The underlying pathogenesis was not appreciated until 1923, when Lucja Frey, a Polish neurologist, observed the phenomenon in a Polish soldier with an infected bullet wound in the parotid gland and suggested that the auriculo-temporal nerve played a role.

Lucja Frey was born in Lwów, Poland, in 1889 and began her medical studies in Lwów before moving to Warsaw to work as a neurologist. She amassed a total of 43 publications on various neurological topics over her career. Unfortunately, during the Second World War she was enlisted into the Lwów ghetto, where she worked until her death in 1943.

We present the history of Frey's syndrome, particularly the life of Lucja Frey and the syndrome she described.

Key words: Frey's Syndrome; Gustatory Sweating; Parotid Diseases

Introduction

The vocabulary of modern medicine is rich with the names of eminent past surgeons and physicians who have over the centuries described and labelled rare syndromes, diseases, anatomical landmarks, clinical signs and procedures. These eponyms are indoctrinated into current medical practice and teaching. Many roll off the tongue without a second thought, yet their namesakes' contributions have formed the foundations for today's ongoing research and medical practice. One such eponym is Frey's syndrome, which was derived from the publications 'Przypadek zespolu nerwu usznokroniowego'[1] and 'Le syndrome du neuf auriculo-temporal',[2] written by the first female academic neurologist in Europe, Lucja Frey, in 1923. Little is known about this woman's short life, but her story is compelling and one can only marvel at her achievements, which she attained as a Jewish physician in Poland.

Frey's syndrome

Frey's syndrome is characterized by flushing, sweating, erythema and general discomfort of the skin in the pre-auricular area, induced by mastication or the anticipation of eating, secondary to the activation of a salivary stimulus.[3] Today, the phenomenon is most commonly reported following parotid gland surgery, but it has also been documented following neck dissection,[4] submandibular gland excision,[5] thyroidectomy[6] and surgery to the temporomandibular joint.[7]

The first known recording of the syndrome was by Duphenix in 1757.[8] However, the underlying pathogenesis of the syndrome was not appreciated until 1923, when Lucja Frey, having observed gustatory sweating and flushing in a Polish soldier with an infected bullet wound in the parotid gland, suggested that the auriculo-temporal nerve played a role in the syndrome's development.[1,2]

The auriculo-temporal nerve provides parasympathetic innervation to the parotid gland, via the lesser petrosal nerve, and sympathetic innervation to the sweat glands and subcutaneous blood vessels. Secretomotor activity of the parotid gland is controlled via a neurological reflex arc, involving parasympathetic fibres. Following damage to the auriculo-temporal nerve, parasympathetic fibres are re-routed along the cut sympathetic fibres and instead innervate the skin vessels and sweat glands, resulting in the salivary stimulus inducing unwanted sweating and flushing of the overlying skin.

Approximately 10 per cent of patients with Frey's syndrome spontaneously complain of symptoms; however, this number increases to 30–50 per cent when patients are directly asked.[3] Often, reassurance and explanation of the underlying condition is sufficient to manage the symptoms. However, medical and surgical interventions are available for the 10–15 per cent of patients who require assistance in

From the Department of Otolaryngology, University Hospital Lewisham, London, UK.
Accepted for publication: 23 August 2005.

alleviating their symptoms.[9] Surgical procedures performed following the recognition of Frey's syndrome have had limited success.[10,11] Techniques performed during the initial operation to reduce the risk of developing Frey's syndrome, such as a sternocleidomastoid flap or superficial musculoaponeurotic system flap,[12,13] have become more favoured. However, it is impossible to determine pre-operatively which patients will develop Frey's syndrome, so the decision to perform prophylactic surgery is difficult.

Medical therapy can involve simple topical agents such as antiperspirants or anticholinergics,[14,15] which are effective for a few days to several weeks. For more prolonged relief, intra-cutaneous injections of botulinum toxin A have been very successful, with minimal associated side effects, and have been shown to be effective for 8–12 months.[16]

History of Lucja Frey

Lucja Frey was born to Jewish parents, Szyman Symcha and Dina Frey, in Lwów, Poland, on 3 November 1889. She was schooled in a Christian elementary school from 1896–1900 and then attended a private Jewish high school, from which she graduated in 1907. Debate arises regarding where and what she then studied at university. Documentation confirms she attended the faculty of philosophy at Lwów University from 1907/8–1912.[17] Burton and Brochwicz-Lewineski[18] recorded that she originally studied maths under Professor Smoluchowski, while Benjamin[19] gave philosophy as her initial subject. Some even state that she went on to Warsaw University to commence studies in medicine, where she graduated in 1913.[20] However, documents confirm that Frey passed an examination for secondary teachers in the mathematical-natural science department in 1913 before commencing medicine at the age of 28 in 1917, all at Lwów University.[17]

During her medical studies, she spent one year (1918–9) working with Professor Orzechowski in the State Hospital at Lwów. He was one of the finest Polish neurologists of his time. It was during this year that she might have given birth to her first child, Jakub, with her partner Marek Gottesman, a lawyer.[17] Following her acquaintance with Professor Orzechowski, she transferred her studies to Warsaw University, where she became a junior assistant at the neurologic clinic, a placement only offered to the more gifted students. Her medical diploma was presented on 2 June 1923 at the age of 34 following an excellent performance in neurology, psychiatry, pathology and general anatomy examinations. She then completed a licensing year as a junior assistant and received her accreditation on 25 June 1925. The literature states that she worked as a senior assistant for Professor Orzechowski from 1921 to 1928,[18] although her published work only commenced in 1923. Her first publication, from which the syndrome today takes its name, was in Polish, subsequently accepted by *Revue Neurologique* in Paris and published under the title 'Le syndrome du neuf auriculo-temporal'.

Subsequent publications followed on neurological topics: brain topography,[21] the effects of vegetable poisons on spinal cord degeneration, anatomical changes in Charcot joints,[22] aneurysms of the medullary plexus[23] and hereditary diseases of the nervous system. A total of 43 articles have been reported in her bibliography. Her peers described her as:

> '...extraordinarily modest, quiet and hard working as an ant. She was distinguished to no mean extent by innovative creativity. All her research works were characterized by an exceptional accuracy, a seeking for a wide and versatile understanding of the problem under study as well as a deep knowledge of her subject.'[18]

From 1928, there is limited information about Lucja's life. We do know that in May 1929 a neurologist named Lucja Frey-Gottesman worked as a deputy senior consultant at the neurologic outpatient clinic of a Jewish Hospital in Lwów. This implied she married her long-term partner Marek Gottesman and also returned to her hometown of Lwów. In 1930, her daughter, Danutu, was born and it is documented that she then moved her family to one of the wealthy areas of Lwów.[17]

The outbreak of the Second World War (1939–1945) changed the lives of Jews in Europe dramatically. In 1939, Lwów, originally a Polish state, became incorporated into the Soviet Ukraine. Jews fleeing German-occupied Poland sought refuge in Lwów in 1940. However, this was to be short-lived, as on 30 June 1941 Lwów fell into German hands. Little is known of the whereabouts of Lucja Frey during these horrific times. Many presume she died 'under the hands of the Germans in Lwów ghetto in 1943'.[19] There is no recorded documentation of her death. Sketchy details exist regarding her last movements before her presumed death. During their occupation, the Nazis continually created rules for Jews; if they failed to comply, they were sent for mass execution. In Lwów this horrendous atrocity was carried out at Belzec death camp. Prior to this, the Jews were housed in ghettos, and the last address of Lucja Frey was in North Lwów, where three weeks subsequently a ghetto was established. She was reported to have worked in the ghetto clinic. The last recorded evidence of Lucja Frey's existence was an issued Green Card, number 144, which she received on 1 April 1942. This gave a glimmer of security from being shot or arrested.[17]

As the Nazis ensured that all traces of identifiable documentation on Jews were destroyed, we may never uncover the details of Lucja Frey's death. She may have been present on 20 August 1942, when all the medical staff and patients of the ghetto clinic were brutally executed, or she may have been a victim of the Belzec death camp. However, there is no doubt that her death preceded the liquidation of the ghetto in June 1943.

Conclusion

Lucja Frey was one of 50 million people who had their lives tragically cut short by the Second World

https://doi.org/10.1017/S0022215106000302 Published online by Cambridge University Press

War. Her eponymous syndrome stands as a testament to an amazingly dedicated physician and scientist. Her story highlights the atrocities that occurred during these times, which will hopefully never be repeated.

- **Frey's syndrome is characterized by flushing and sweating of the pre-auricular skin area on mastication or anticipation of eating**
- **Lucja Frey first described the underlying pathogenesis of this phenomenon in 1923**
- **She was a Polish neurologist whose life was brutally cut short by the Second World War**
- **Today, Frey's syndrome most commonly occurs following parotid gland surgery**

References

1 Frey L. The syndrome of the auriculo-temporal nerve. *Pol Gaz Lek* 1923;**41**:708–10
2 Frey L. The syndrome of the auriculo-temporal nerve. *Rev Neurol* 1923;**II**:97–104
3 Linder TE, Huber A, Schmid S. Frey's syndrome after parotidectomy: a retrospective and prospective analysis. *Laryngoscope* 1997;**107**:1496–501
4 Myers EN, Conley J. Gustatory sweating after a radical neck dissection. *Arch Otolaryngology* 1970;**91**:534–42
5 Earley MJ, Stack MM. Gustatory sweating following submandibular gland excision. *Br J Plastic Surg* 1988;**41**: 420–1
6 Cunliffe WJ, Johnson CE. Gustatory hyperhidrosis. a complication of thyroidectomy. *Br J Derm* 1967;**79**:519–26
7 Hermann A, Zoler J, Maier H. Frey's syndrome (gustatory sweating) after fracture of the temporomandibular joint. *Laryngorhinootologie* 1991;**70**:196–8
8 Duphenix M. Comments on fistulas of the parotid salivary duct. *Memoires de l'Academie Royal de Chirurgie* 1757;**3**: 431–9
9 Laccoureye H, Laccoureye O, Cauchois R. Total conservative parotidectomy for primary benign pleomorphic adenoma of the parotid gland: a 25-year experience with 229 patients. *Laryngoscope* 1994;**104**:1487–94
10 Golding-Wood PH. Tympanic neurectomy. *J Laryngol Otol* 1962;**76**:683–93
11 Sessions RB, Roark DT, Alford BR. Freys syndrome: a technical remedy. *Ann Otol* 1976;**85**:734–9
12 Singleton GT, Cassisi DDS. Frey's syndrome: incidence related to skin flap thickness in parotidectomy. *Laryngoscope* 1980;**90**:1636–9
13 Moulton-Barrett R, Allison G, Rappaport I. Variations in the use of SMAS (superficial musculoaponeurotic system) to prevent Frey's syndrome after parotidectomy. *Int Surg* 1996;**81**:174–6
14 Hays LL. The Frey syndrome: a review and double-blind evaluation of the topical use of a new anti-cholinergic agent. *Laryngoscope* 1978;**88**:1796–824
15 Harper KE, Spielvogel RL. Frey's syndrome. *Int J Dermatol* 1986;**25**:524–6
16 Schulze-Bonhage A, Schroder M, Ferbert A. Botulinum toxin in the therapy of gustatory sweating. *J Neurol* 1996; **243**:143–6
17 Moltrecht M, Michel O. The woman behind Frey's syndrome: the tragic life of Lucja Frey. *Laryngoscope* 2004; **114**:2205–9
18 Burton MJ, Brochwicz–Lewineski M. Lucja Frey and the auriculotemporal nerve syndrome. *J Roy Soc Med* 1991; **84**:619–20
19 Benjamin E. The lady and her syndrome: Lucja Frey (1889–1943). *Otorhinolaryngol Head Neck Surg* 2001; **5**(3):111
20 Bennett JD. Frey's syndrome: the untold story. *J Med Biogr* 1993;**1**:125–7
21 Frey L. The contribution to the science about topography in the brain. Focusing on the highest level of the pons varolli. *Neur Pol* 1925;**8**:124
22 Frey L, Orzechowski K. Anatomical variations in Charcot disease. *Neurol Pol* 1925;**8**:196
23 Frey L. The case of aneurysm in the medullary plexus. *Neurol Pol* 1926;**9**:21

Address for correspondence:
Miss Nicola Jacobsen,
Department of Otolaryngology,
University Hospital Lewisham,
Lewisham High Street,
London SE13 6LH, UK.

Fax: +44 (0)208 333 3188
E-mail: nickyjacobsen@yahoo.co.uk

Miss N Jacobsen takes responsibility for the integrity of the content of the paper.
Competing interests: None declared