

## Guillaume-Benjamin-Amand Duchenne

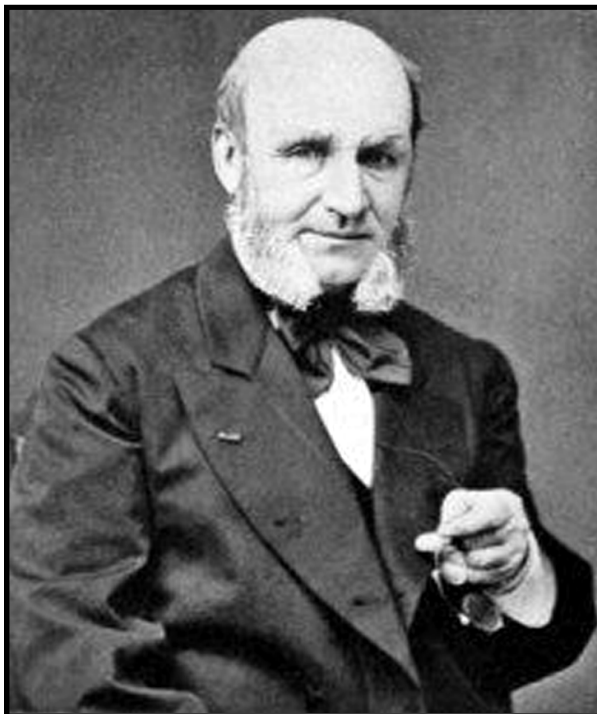
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### Abstract

The era of modern Neurology progressed from Duchenne's understanding of the conductivity of neural pathway, his revelations of the effect of lesion of these structures and his diagnostic innovation including deep tissue biopsy, Nerve Conduction Test (NCS) and clinical photography.

**Keywords:** Guillaume-Benjamin-Amand Duchenne; Duchenne Muscular Dystrophy; Duchenne's Smile.

### Introduction



Duchenne (1806-1875) was born on the 17th of September 1806, in Boulogne-sur-Mer (Pas-de-Calais, France). His father was marine captain during Napoleon Bonaparte's wars. Neurology did not

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exist in France before Duchenne and although many medical historians regard Jean-Martin Charcot as the father of the discipline, Charcot owed much to Duchenne, often acknowledging him as, "mon maitre en neurologie" (My master in Neurology).

The American neurologist Dr. Joseph Collins (1866-1950) wrote that Duchenne found neurology, "a sprawling infant of unknown parentage which he succored to a lusty youth [1]."

He studied Medicine in Paris and became a physician in 1831. Duchenne conducted many experiments using electricity as a therapeutic and diagnostic tool. In 1850, he published his first results regarding the connection between facial expression and electrical stimulation of muscles. Duchenne studied paralysis and several myopathies.

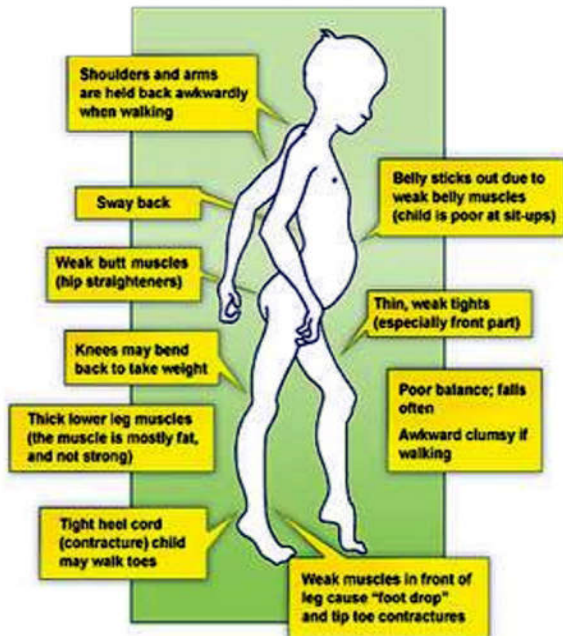
He created a harpoon that could be used to extract a sample of muscle tissue and this instrument was a predecessor of modern biopsies.

His greatest contributions were made in the myopathies that came to immortalize his name,

- Duchenne Muscular Dystrophy
- Duchenne-Aran Spinal Muscular Atrophy
- Duchenne-Erb Paralysis
- Duchenne's Disease (Tabes dorsalis)
- Duchenne's paralysis (Progressive Bulbar Palsy)

### *Duchenne Muscular Dystrophy*

Recessive X-linked form of muscular dystrophy, which results in degeneration and eventually death



### *Progressive Muscular Atrophy*

Also k/a Duchenne-Aran muscular Atrophy And Duchenne-Aran disease is rare subtype of Motor Neuron disease which affects only Lower Motor Neuron. Account for around 4% of all MND.

### *Duchenne's Paralysis*

Paralysis of arm caused by injury to the upper group of the arm's main nerves, specifically the severing of the upper trunk C5-C6 nerves.

### *Duchenne Disease (Tabes Dorsalis)*

Also k/a Syphilitic Myelopathy, is a slow degeneration (specifically demyelination) of the sensory neurons that carry information to the Brain.

### *Progressive Bulbar Palsy*

MND, Disease that attacks the nerve supplying the Bulbar Muscles.

Duchenne described the pseudohypertrophic paralysis in 1868, using also his harpoon for the studies Duchenne characterizes the muscle weakness that first appears in the lower limbs and lumbar region, followed by progression to upper limbs, the increase in muscle mass due to development of interstitial connective tissue and overproduction of fibroses and adipose tissue in more advanced stages. He thought that the term myo-sclerotic paralysis was more appropriate based on histopathologic aspect [2].

Along the description of diseases named after him, *Duchenne* also contributed to differentiation of facial nerve paralysis caused by central and peripheral neuron; he described the cog wheel sign in Parkinson disease, the characteristics of lead intoxications and the epigastric respiratory depression of phrenic paralysis is called *Duchenne sign*.

He described the advantages and disadvantages of *static and dynamic electric power* use in therapy and diagnosis. The description of Duchenne's smile remains classical – there can be differentiated a fake from a sincere smile, as the second involves both the contraction of great zygomaticus and inferior part of orbicularis, while the first is the simple contraction of the great zygomaticus.

Duchenne defined the fundamental expressive gesture of the human face and associates each with a specific facial muscle or muscle group. He identifies 13 primary emotions the expression of which is controlled by one or two muscles. Sunil Mhaske *et al* / Guillaume-Benjamin-Amand Duchenne.

### *Different Expressions of Face*



He was the first clinical to practise muscle biopsy, the harvesting of in vivo tissue sample with an invention he called, *Duchenne's trocar*.

In 1855 he formalized the diagnostic principles of electrophysiology and introduced Electrotherapy in his textbook.

Duchenne remains a remarkable figure of

neurology, which he inovated both as diagnosis and therapy. As an open minded brilliant researcher, he had his work recognized only after death, but nowadays, he is considered one of the greatest minds of the 19<sup>th</sup> century.

He was a complex personality, devoting his mind to medicine, but also art, technique and photography. Duchenne died of Cerebral Heamorrhagic bleeding in 1875, after several years of illness [3].

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