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RESEARCH ARTICLE

TRAUMATIC NEUROMA

Jyoti bala, Pratima, Pratibha Taneja and Prachi Agarwal

SRCDSR, Faridabad

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ABSTRACT

Traumatic neuroma is a well-known disorder involving peripheral nerves, which occurs following trauma or surgery. The lesion develops most commonly in the soft tissues of the mental foramen area, lower lip and tongue. Intra-osseous lesions arising in jawbones are very uncommon. Traumatic neuromas are rare entities which characteristically arise subsequently to surgery and are usually accompanied by pain, typically neuralgic. Traumatic neuroma is not a true neoplasm but a neural reaction subsequent to damage of the peripheral nerve.

INTRODUCTION

Traumatic (post-traumatic) or amputation neuroma is not a true neoplasm, but rather an exuberant attempt at repair of a damaged nerve trunk, i.e. hyperplasia of nerve fibers and their supporting tissues.[1]

Definitions

- *Argenyi ZB*(1990) - The traumatic neuroma is a non-neoplastic lesion characterized by the proliferation of schwann cells and nerve fibers that arise following injury to a nerve.[2,3]
- *WHO (*2006)- Traumatic neuromas represent a reactive or regenerative proliferation of the nerve sheath components as an attempt to reestablish lost nerve integrity after sharp or blunt physical trauma.[4]
- *Enzinger (2008)*- Traumatic neuroma is an exuberant but non-neoplastic proliferation of a nerve occurring in response to injury or surgery.[5]

History and Terminology

- *Reed (1979)*-First described this lesion.[1]
- *Odier* (1811)-Firstly amputation neuroma was a synonym to traumatic neuroma.[6]
- *Cahn* (1939)-The first one who reported the first traumatic neuroma of the mental foramen.[6]
- *Peszkowski and Larsson* (1990)-Traumatic neuroma is a reactive proliferation of nerve fibers which occurs as a result of abnormal healing after either an injury or surgery.[7]

Prevalence, Incidence and Frequency

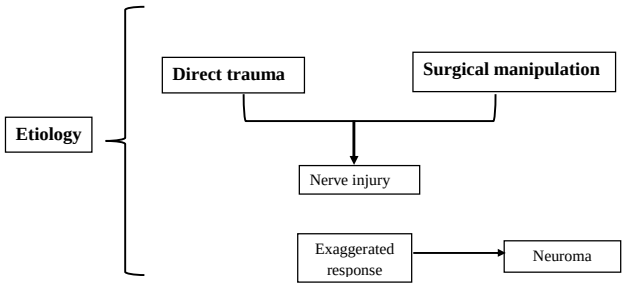
- *Yabuuchi H (*2004) & *Ozcan R (*2012) - Incidence is about 1.1–2.7% after neck dissection.[8,9]
- *Vora A* (2005) - Incidence of lingual nerve damage during this procedure ranges from 0.5% to 23%.[10]

Age & Gender

- *WHO* (2005) - Traumatic neuromas can occur at any age and gender.[2]
- *Jham B* (2014) - Traumatic neuromas can occur at any age, but they are diagnosed most often in middle-aged adults and slightly more common in females with an estimated female-to-male ratio of 2:1.[11,12,13,14]

Etiology

- In the oral and maxillofacial region, traumatic neuroma has been reported subsequent to elective surgery approach such as tooth extraction, neck dissection, ramus split surgery, incision and drainage and parotidectomy.
- In several researches, extraction may be the most common etiologic factor in oral cavity.
- *Sist and Greene* (1981) - confirmed the concept that traumatic neuromas in oral cavity may account for some cases of atypical facial pain and trigeminal neuralgia.[6]



Site

- ***Regezi* (2003)** - The mental foramen is the most common location, followed by extraction sites in the anterior maxilla and the posterior mandible. The lower lip, tongue, buccal mucosa, and palate are also relatively common soft tissue locations.[12]
- ***Jaafari Ashkavandi Z (2013)*** - Traumatic neuroma of the oral mucosa is mainly found in the gingiva after tooth extraction.[14]
- ***Jham B* (2014)** - The most common location is the posterior mandible, due to damage of the alveolar inferior nerve following tooth extraction or sagittal ramus split during osteotomy.[13]
- ***Jham B* (2014)** -Most common in the mental foramen area, tongue. and lower lip.[11,13,15,16]

Clinical Presentation

- Traumatic neuromas develop at the sites of previous trauma usually as solitary, skin-coloured, broad-based, firm papules and nodules.[4]
- They are often sensitive or painful on pressure. Lancinating pain is characteristic of amputation neuromas.[11]
- About half the patients with oral traumatic neuromas have associated pain. Pain ranges from occasional tenderness to constant, severe pain.[12]
- Radiating facial pain may occasionally be caused by a traumatic neuroma.[13,15]
- Clinically, neuralgic pain with trigger point in the area of neuroma or painful hypersensitivity to normal light tactile stimuli may be the prominent symptom.[6]
- It commonly present as tenderness on slightly percussion or pressure, or distortion of surrounding tissue.[16,5]
- It is a firm, oval, slowly growing, palpable painful or asymptomatic nodule, no longer than 2 cm with normal coloration.[6]

Oral Manifestation

- The oral traumatic neuroma usually appears as a small nodule or swelling of the mucosa, typically near the mental foramen, on the alveolar ridge in edentulous areas or on the lips or tongue.[1]
- Traumatic neuromas of the oral mucosa are typically smooth-surfaced, non-ulcerated nodules.[11]

Pathologic Features

Macroscopic Features

- Traumatic neuromas are firm, white-yellow, ill-defined dermal or subcutaneous masses often in a discernible association with the proximal nerve stump.[4]
- Grossly, the lesions are circumscribed, white- grey, nodules seldom exceeding 5cm in diameter.[5]

Microscopic Features

- The tumor is encased in the sclerotic stroma, but there is no true encapsulation, and the distal end of the regenerating nerve fascicles often infiltrates the stroma.[4]
- The individual nerve fascicles appear to recapitulate the architecture of the normal nerve fascicles, but there is considerable variation in their diameter. The constituent cells are slender spindle cells (Schwann cells, perineurial cells, and endoneurial fibroblasts).[4]
- The histologic appearance of the neuroma is characteristic and shows a mass of irregular and often interlacing neurofibrils and Schwann cells situated in a connective tissue stroma scant or predominant. [1,4,12,13,16]
- The proliferating nerve fibers themselves may occur either in small discrete bundles or spread diffusely throughout the tissue.[1]
- Much of this connective tissue is probably derived from the perineurium. [1]
- Earlier lesions show acute and chronic inflammation, occasional granulomatous inflammation, whereas more established lesions are markedly fibrotic.[4]

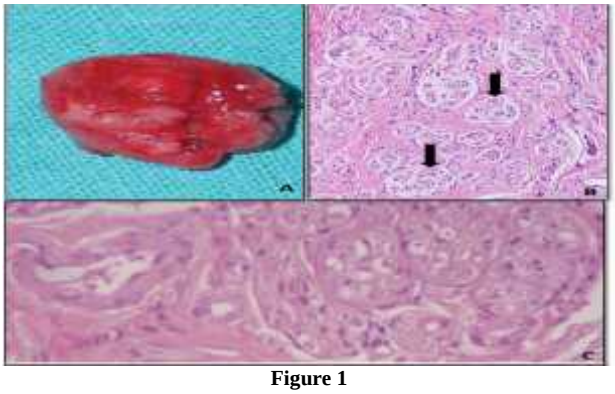


Figure 1

A. Gross specimen of the traumatic neuroma.
B. Multiple nerve fascicles (black arrows) seen proliferating in a collagenous connective tissue stroma (low magnification)
C. High power magnification of nerve bundles of a cross section of nerve fibers in a fascicular arrangement.

Histopathological Differential Diagnosis

Treatment and Prognosis

- Surgical excision along with a small proximal portion of the involved nerve.[1,4,6,11,13]
- Even though surgical transaction of a peripheral nerve may have caused the lesion, surgical excision is the treatment of choice. Recurrence is infrequent.[12]
- Avoiding injury to the great auricular nerve and anterior auricular nerve during neck dissection is difficult therefore, careful suture- tying of the cut end of the nerve to prevent traumatic neuroma should be a consideration.[17]

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	Traumatic Neuroma		**Neurofibroma**
1.	Participation of all elements of nerve fascicles	1.	Characteristic collagen bundles in neurofibroma intermixed with a myxoid component
2.	Presence of damaged nerve Traumatic Neuroma	2.	Absence of damaged nerve Palisaded encapsulated neuroma
1	Disorganized proliferation of the proximal nerve gives rise to a neuroma	1.	A more circumscribed, orderly arrangement of fascicles
2	Fascicles are surrounded by perineural cells Traumatic Neuroma	2.	Perineural cells are mainly in the capsular areas Leiomyoma
1.	Presence of neural elements and bundles in a fascicular arrangement Traumatic Neuroma	1.	Presence of muscle fiber bundles in a collagenous background Multiple Endocrine Neoplasm
1.	Tangled mass of Schwann cells and fibroblasts, all in a dense, collagenous matrix	1.	Present as tortuous bundles of nerves, with a prominent perineurium within a fibrous stroma

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