# ANATOMY OF THE BRACHIAL PLEXUS

**Essay**

*Submitted For Partial Fulfillment*
*Of Master Degree*
*In Basic Medical Science (Anatomy)*

**By**

**Shaimaa Mohamed Mohamed Hafez**
*M.B.B.Ch.*

**Under Supervion of**

**Dr. Olfat Anwar Abd El-Aty**
*Assistant Professor of Anatomy*
*Faculty of Medicine for Girls*
*Al-Azhar University*

**Dr. Hala Hamed Musalim**
*Lecturer of Anatomy*
*Faculty of Medicine for Girls*
*Al-Azhar University*

**Faculty of Medicine for Girls**
**Al-Azhar University**
**2014**

"وآتاكم من كل ما سألتموه وإن تعدو
نعمت الله لا تحصوها إن الإنسان لظلوم
كفار"

صدق الله العظيم

سورة ابراهيم

الأية ٣٤

# *Acknowledgement*

*First thanks to* ***Allah*** *to whom I relate any success in achieving any work in my life.*

*I wish to express my deepest thanks, gratitude and appreciation to* ***Dr. Olfat Anwar Abd El-Aty****, Assistant Professor of Anatomy for her supervision, kind guidance, valuable instructions and continuous help.*

*Special thanks and sincere appreciation to* ***Dr. Hala Hamed Musalim*****,** *Lecturer of Anatomy for her sincere efforts and fruitful encouragement.*

*I am indebted for my family.*

To the soul of my father.

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# List of abbreviations

| **Abb.** | **Full term** |
|---|---|
| SSN | Suprascapular nerve |
| AIN | Anterior interosseous nerve |
| U.L | Upper limb |
| L.L | Lower limb |
| PNS | Peripheral  nervous system |
| CBPP | Congenital brachial plexus palsy |
| OBPI | Obstetric Brachial Plexus Injury |
| MRI | Magnetic resonance imaging |
| IBN | Idiopathic Brachial Neuritis |
| nTOS | Neurogenic Thoracic Outlet Syndrome |

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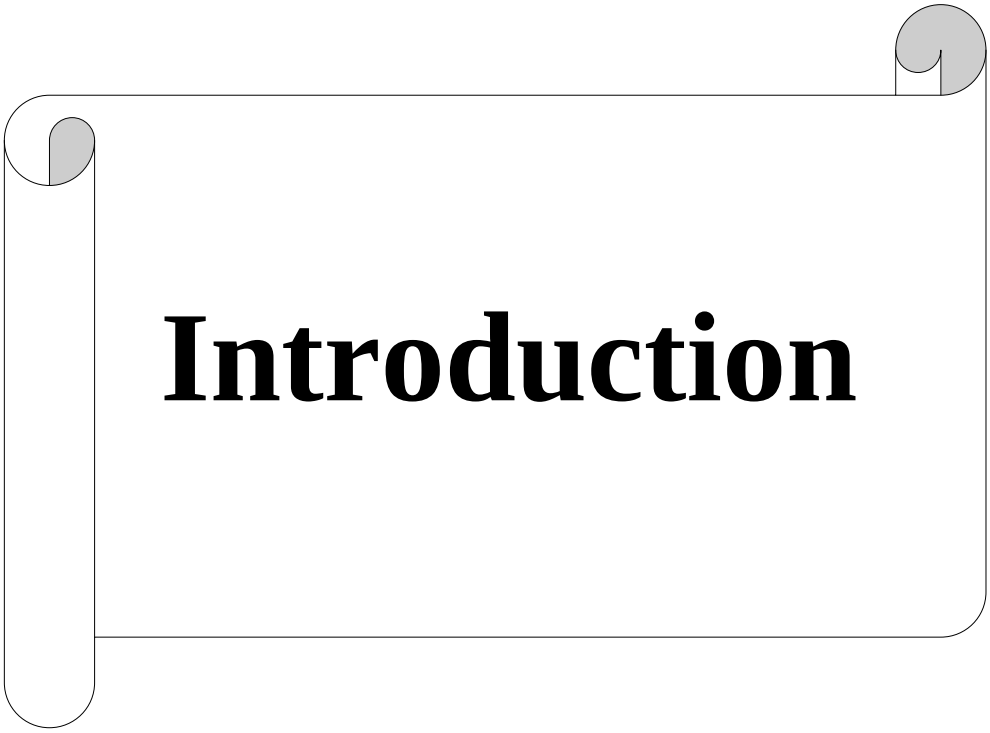
Introduction

# Introduction

The brachial plexus is the network formed by the communication between the anterior rami from the fifth to the eighth cervical nerve roots and first thoracic nerve root. The brachial plexus is divided into roots, trunks, divisions, cords and branches. There are five terminal branches and numerous other pre-terminal or collateral branches that leave the plexus at various points along its length. The nerves entering the upper limb provide the following important functions: sensory innervation to the skin and deep structures, such as the joints and motor innervation to the muscles **(Moore et al., 2007; Snell, 2008 and Standring et al., 2008).**

**Snell, (2008)** reported that, the branches of the roots of the brachial plexus are: the dorsal scapular nerve (C5) and the long thoracic nerve (C5, 6, and 7). The upper trunk gives rise to the suprascapular nerve and nerve to subclavius (C5 and 6). The lateral cord gives the lateral pectoral nerve, the musculocutaneous nerve and the lateral root of median nerve. While the branches of the medial cord are the medial cutaneous nerve of the arm and the medial cutaneous nerve of the forearm, the medial pectoral nerve, the ulnar nerve and the medial root of median nerve. The posterior cord gives the upper and the lower subscapular nerves, the thoracodorsal nerve, the axillary nerve and the radial nerve**.**

Embryologically, motor nerve fibers begin to appear in the fourth week of gestation, arising from nerve cells in the basal plates of the spinal cord. These fibers collect into bundles known as ventral nerve

roots. Dorsal nerve roots formed as collections of fibers originating from cells in dorsal root ganglia. Central processes from these ganglia form bundles that grow into the spinal cord opposite the dorsal horns. Distal processes join the ventral nerve roots to form a spinal nerve. The spinal nerves divide into dorsal and ventral primary rami. The dorsal primary rami innervate the dorsal surface. The ventral primary rami innervate the limbs and ventral body wall and form the major nerve plexuses as brachial and lumbosacral **(Sadler, 2003).**

Variations in the anatomy of the upper limbs, especially in its nerves, vessels and muscles, are common and have been reported by many investigators. In this regard, variations in the formation of the brachial plexus are of a great interest for all the clinicians. Knowledge of such anatomical variations of the brachial plexus and its branches in the upper limb is important because these variants could be injured during surgical procedures, producing unusual clinical symptoms **(Williams et al., 1995; Sud, 2000 and Gupta et al., 2005).**

Diseases, stretching, and wounds in the lateral cervical region of the neck or in the axilla may produce brachial plexus injuries. Injury of the brachial plexus causes severe and chronic impairments in both adults and children, thus requiring an early and long-lasting treatment. Brachial plexus injury, or Erb-Duchenne paralysis, is relatively common among neonates. Although some of these injuries can result from traumatic delivery, others may be caused by intrauterine positioning. Brachial plexus disorders may be hereditary caused by

infantile myofibromatosis, or it may be iatrogenic **(Moore and Dalley, 2006 and Smania et al., 2012).**

Management of brachial plexus injury sequelae is a challenging issue in neurorehabilitation. In the last decades great strides have been made in the areas of early diagnosis and surgical techniques. Successful results in the management are based on the knowledge of anatomic arrangement, pathophysiology considerations, preoperative evaluation and diagnosis. Also surgical technique, postoperative management, rehabilitation and regular patient follow-up are factors influencing its results **(Chuang, 1999 and Smania et al., 2012).**

# Aim of the work