

## Dental arch length and arch symmetry analysis of Nepalese permanent dentition

Shrestha RM<sup>1</sup>, Bhattarai P<sup>2</sup>

<sup>1</sup>Consultant Orthodontist, Kathmandu Model Hospital, <sup>2</sup>Consultant Orthodontist, The Orthodontic Center

### Abstract

**Objective:** To study the dental arch lengths at canines and first molars of permanent dentitions of Nepalese adults using Lavelle's method.

**Materials and methods:** Dental stone models of one hundred subjects with normal occlusion and dentofacial proportion were studied using standard Boley gauze. The study compared gender differences among the Nepalese adults as well as between the Nepalese and Caucasian samples.

**Results:** Arch lengths of the Nepalese males were significantly greater than those of the females at all parameters studied except at mandibular canine. The arch lengths of the Nepalese adults were significantly greater than those of the Caucasians except at mandibular canine.

**Conclusion:** Significant variation between left and right sides of the dental arch lengths at mandibular canine region suggest asymmetry of dental arch among Nepalese adults.

**Key words:** Arch length, Arch Symmetry, Lavelle's method

### Introduction

Lavelle<sup>1</sup> in 1971 defined dental arch length as the oblique dimension measured between the most mesial aspect of anterior teeth and the most distal aspects of posterior teeth. The dental arch length denotes the sagittal dimension of the dental arch from most anterior reference point to the posterior surface. Various researchers have measured the dental arch length differently; and many consider arch length and arch depth synonymously. Other researchers including Burris<sup>2</sup>, DeKock<sup>3</sup>, and Barrett<sup>4</sup> measured arch length at mid-palatal line. Sanin<sup>5</sup> estimated dental arch length using fourth degree polynomial formula.

Anthropologists believe that different racial types have differently shaped dental arches. Williams<sup>6</sup> in 1917 stated that arches vary slightly to harmonize with different racial types, and the variability within a racial type is extremely less. Laine<sup>7</sup> showed that, arch length did not differ from one Caucasoid population group to another of same age range. Buris<sup>2</sup>, Merz<sup>8</sup> found that the Black subject's arches were longer compared to Whites. Confirming the general observation, most of the researchers including Barrett<sup>4</sup>, Bishara<sup>9</sup>, and Huang<sup>10</sup> found greater dimension of arch length in males compared to females.

The study on dental arch symmetry is of interest to orthodontists from functional as well as esthetic point of view. Historically Gruenburg<sup>11</sup> in 1912 devised "symmetroscope" to measure the symmetry of the dental arch; later Friel<sup>12</sup> modified it as a transparent celluloid sheet with ruled squares. Lu<sup>13</sup> in 1964 studied the symmetry of dental arch using orthogonal polynomial analysis. BeGole<sup>14</sup> suggested cubic spline curve as an ideal means to represent the asymmetry of the dental arch. Comparing left and right sides of the dental arch has been the most common method to describe the arch asymmetry. Lavelle & Plant<sup>15</sup> compared right and left sides of the dental arch with normal occlusion to analyze arch symmetry using traveling microscope.

The racial, sexual and symmetrical variations in dental arch lengths are thus deemed important to be analyzed for permanent dentition of the Nepalese adults. The study is believed to be useful for orthodontic, odontometric and anthropometric purposes.

### Materials and methods

The sample consisted of dental stone cast of one hundred Nepalese adults aged 17 to 32 years; with

### Correspondence

Dr. Rabindra Man Shrestha, Consultant Orthodontist, Kathmandu Model Hospital, Kathmandu  
E-mail: rabindramans@hotmail.com