

## Anatomy and Physiology

### Laboratory X - Antropometry

Anthropometry refers to the measurement of the human individual. An early tool of physical anthropology, it has been used for identification, for the purposes of understanding human physical variation, in paleoanthropology and in various attempts to correlate physical with racial and psychological traits. Anthropometry involves the systematic measurement of the physical properties of the human body, primarily dimensional descriptors of body size and shape.

Static anthropometry (goniometry) is the measurement of angles between planes and sections of the body or bones. It deals with the measurements of features in fixed positions of a person: standing, sitting, lying down. Measurements can be divided into:

- height measurements (body height, length of the lower limbs, etc.)
- length measurements (arms, trunk, upper limbs, etc.)
- width and depth measurements (shoulders, hips, etc.)
- perimeter measurements(head, neck, waist, etc.)
- diameter of the handle grip;
- feet arch coordinates;
- angles between fingers;
- other.

Dynamic anthropometry involves measurement of ranges of motion in various joints of the body (trunk, upper and lower limbs). These measurements determine the span and ranges of movements. Measurements of dynamic features include:

- angles of deflection of upper and lower limbs (whole limbs and parts of limbs) in the horizontal and vertical direction;
- deflection angles and head rotations;
- rotation angles of the limbs and parts of the limbs;
- dorsal and plantar rotation angles of feet;
- deflection angles of a hand clenched on the cylindrical handle.

#### Part 1

Make measurements of head and upper and lower limbs for all group members and compare obtained values with those calculated according to the formula and coefficients given in Figure 1. Write the results in a table according to the template (Table1).

Table 1

Measurement	Coefficient	Calculated value	Measured value
Height	-	-	
P1 - palm	0,108		
P2 - forearm	0,146		
P3 - arm	0,186		
P4 - dist. to wrist	0,485		
P5 - dist. to elbow	0,630		
P6 - dist. to shoulder	0,818		
P7 - dist. to knee	0,285		
P8 - dist. to hip	0,530		
P9 - head	0,130		

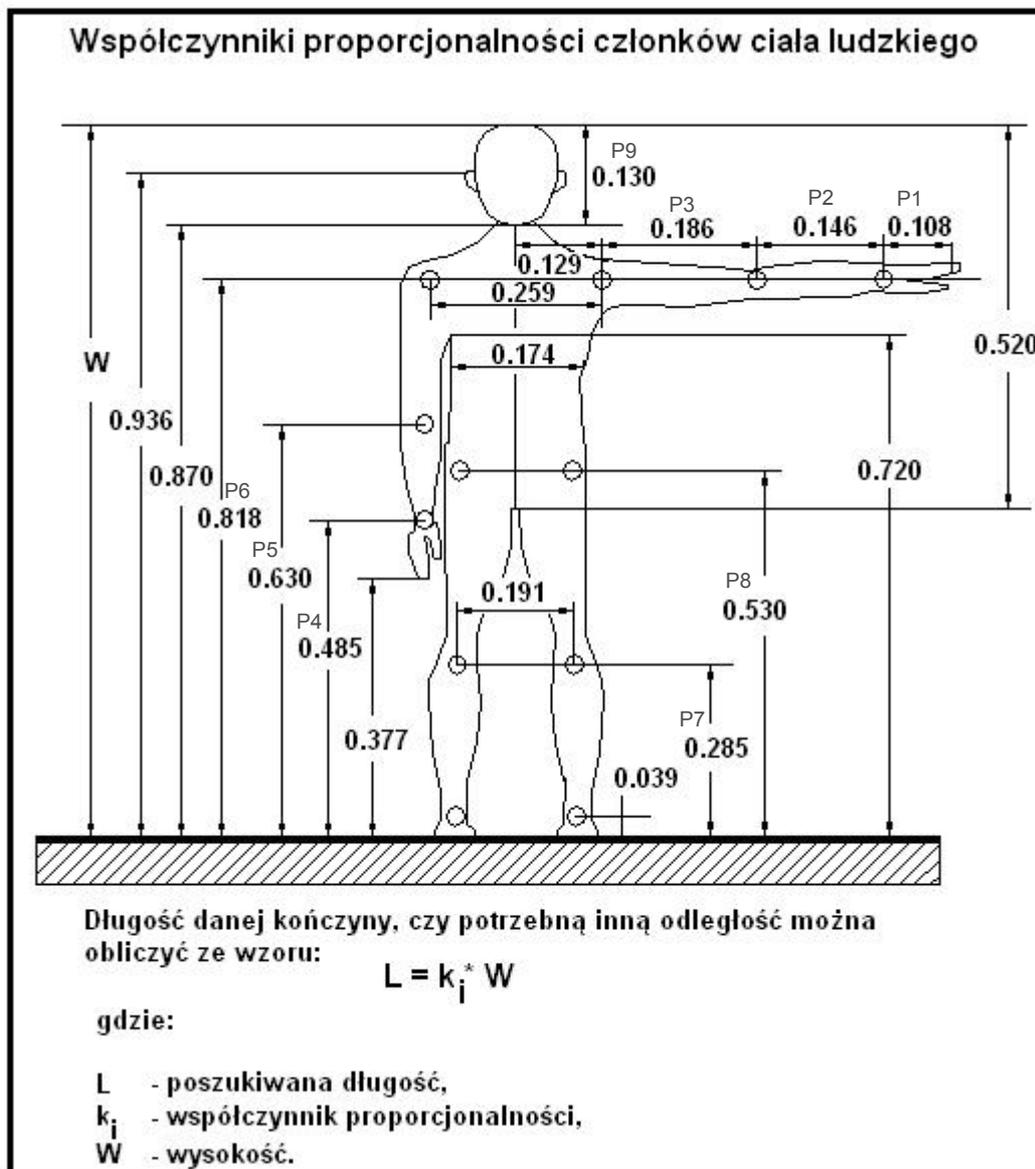


Figure 1.

## Part 2 - dynamic anthropometry

Use FreeStep software and Moover 3D sensor to perform measurements of head movements ranges. Measure rotation ranges for all group members according to the procedure described below. The report from this part must contain printscreens of the obtained plots, translated examination report generated by the FreeStep software and your reflection from the exercise.

1. Select option "Baza danych pacjentów" (Patient database) and add new patient (button at the bottom on the right). Fill in the required fields (fig. 2): Last name and first name (Nazwisko i imię), Date of birth (Data urodzenia), Gender (Płeć), Height (Wzrost), Weight (Waga), Shoe size (Nr obuwia). Save data (Zapisz) and close the window (Zamknij).

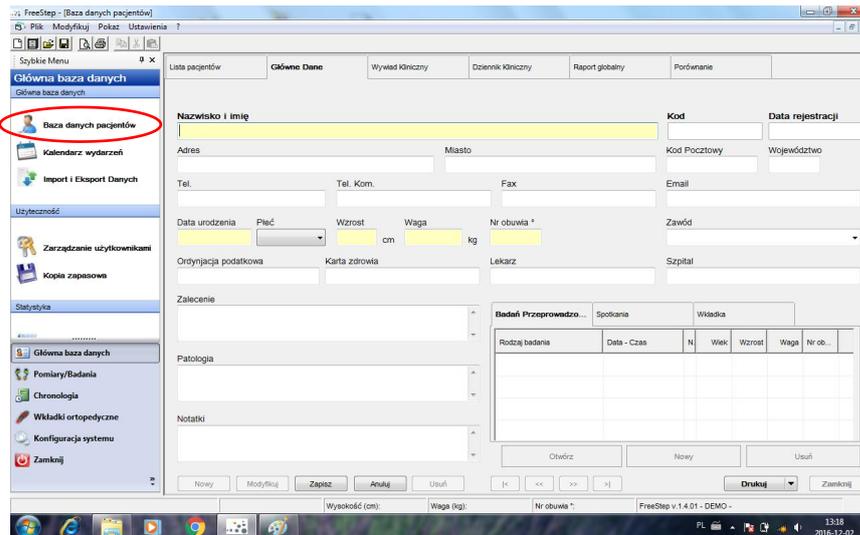


Figure 2.

2. Select “Measurements” (“Pomiary/Badania”), next “Goniometra” (goniometry) and “Szyjny” (cervical) (fig. 3).

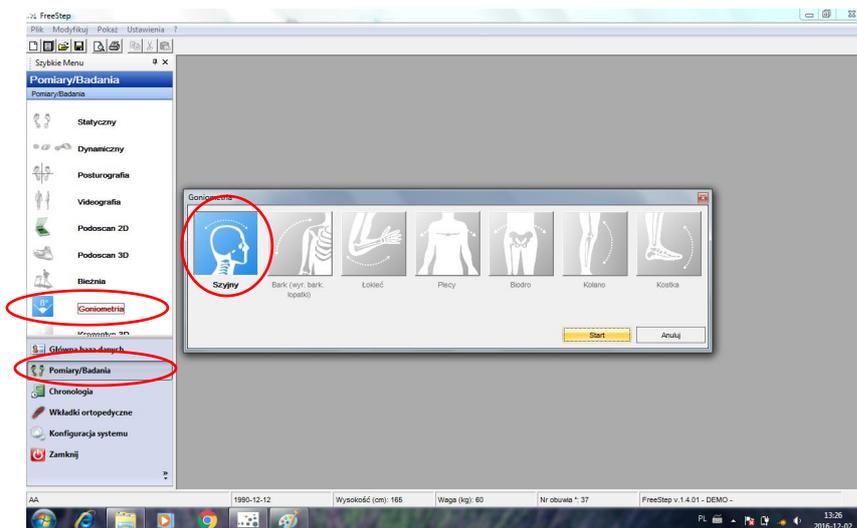


Figure 3.

3. Put the band with Moover 3D sensor on the head (fig. 4). Examined person should not see the screen with the plots and results during the examination procedure.



Figure 4.

4. Start the measurement procedure for left-right rotation (Rotacja prawo-lewo) by selecting “Start” and “Rozpoczęcie analizy”. If the software runs in the mode with Italian language press “Inizia Analisi”. Examined person has to perform 5 head rotations in each direction. After the exercise press red button “Koniec analizy” and save the analysis (Tak) (fig. 5). In case of Italian version select “Termina Analisi” and next “Si”.

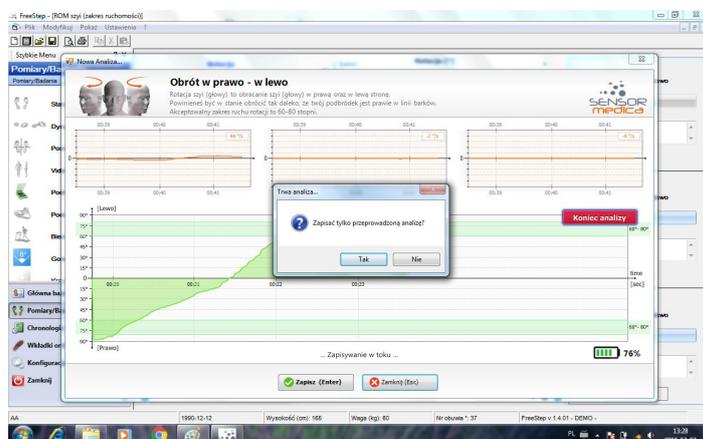


Figure 5.

5. Repeat the measurement procedure for remaining two types of movement: Tilt (“Boczne zginanie”) and Nod (“Zginanie do przodu i do tyłu”) (fig. 6).



Figure 6.

6. Examine plots displayed for performed analysis (fig. 7) and read the summary of the analysis generated by the FreeStep software: close the measurement window, select “Baza danych pacjentów”, double-click on the field with you analysis and select “Podsumowanie” (fig. 8, 9).

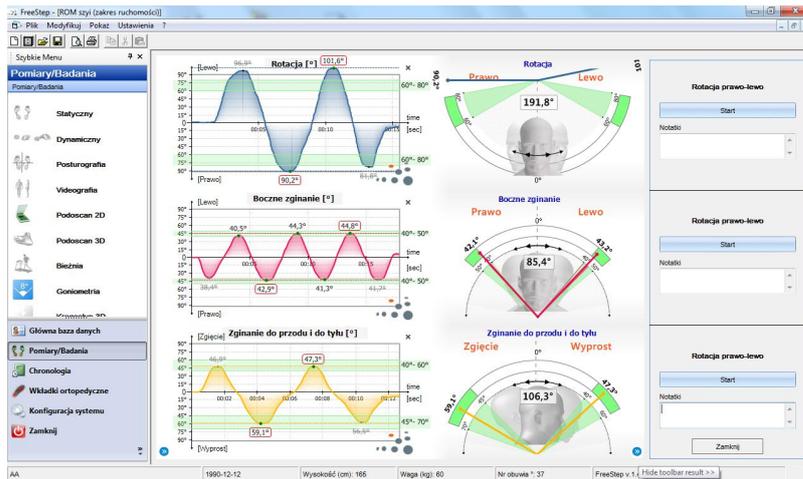


Figure 7.



Figure 8.

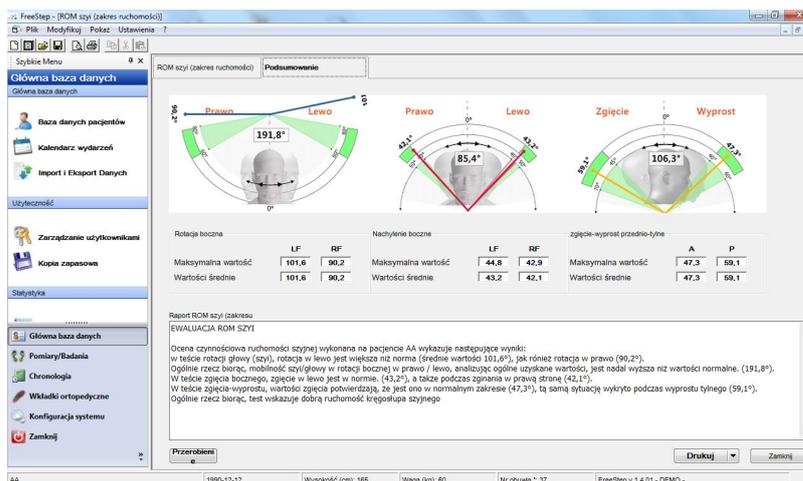


Figure 9.

7. Repeat measurement procedure for all group members.