Modelling of torque-angle relationships with polynomials and cubic splines in elbow joint

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The aims of this study are: (1) to assess modeling of elbow torque-angle relationships in trained and untrained men using polynomial functions from second to fifth order with optimization criteria; and (2) to compere the modeling with cubic splines.
Ten untrained men and fifteen arm wrestlers were tesed by isokinetic dynamometer with isometric protocol. The peak, net torque of flexors and extensors of the elbow joint was registrated in Nm and normalized in percent in the 10 angular positions at range of 10 to 125 degrees. The data were modeled: with a polynomial function of the second to fifth order by the method of least squares by ussing Akaike's information criteria (AIC) and Bayesian information criteria (BIC); with a cubic spline.
It was found that: (1) the differierences between trained and untrained do not concerns the results of modeling, but the peak torque values and the behavior of extensors in the area of flextion; (2) the assessment according to the criteria AIC and BIC in modeling of torque-angle relationships with polynomial functions does not give a definite answer in both muscle groups and both samples; the approximating curve excludes the maximum torque; and (3) in modeling the torque-angle relationship with cubic polynomial splines the interpolating curves encompass all points, including the maximal torque but the curves are not smooth and some additional requirements probably must be pointed out.
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