



International standardization of clinical stabilometry (Minutes of the meeting of posturologists, Paris 07.10.2015)

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ABSTRACT

Stabilometry, like any technology, generates its own language that must be enslaved to the requirement of the psychology of scientific discovery: the communication between minds. We know of no other way of this enslavement than normalization. Normalization that has proved impossible apart from its specification by a research prospect, for example, trying to treat functional disorders of the upright postural control system. This research, which, oddly enough, for the time being, only Latin therapists are interested in.

MEETING REPORT

The International Society of posture and gait research (ISPGR) was founded in 1969 as the “International Society of Posturography”. The attention of its founders was then focused on the recording techniques of posture. During the first congresses of the society, the large number of different recording techniques of posture quickly emerged as a communication problem, difficult to overcome, so that during the fifth International Congress, Amsterdam 1979, the Society entrusted a committee to study how to solve this communication problem. This committee, chaired by TS Kapteyn and composed mainly of Dutch clinicians and researchers made an exhaustive inventory of all the methods available at that time to record posture and among all these methods, the force platforms were considered the best recording techniques of posture to be favoured. These conclusions were presented at the Kyoto Congress in 1981. Discussed and accepted by the Society, they were published in 1983 in the journal *Agressologie*.⁽¹⁾ During the Houston (Tx) Congress, that same year, the committee disbanded, saying it had nothing more to do.

Back from Houston, the French group did not accept the dissolution of the committee, feeling its work had not been completed; its recommendations were far from covering all the possible fields of standardization stabilometry, elected as the method of choice. No indication was given on metrology issues. The advices about the recording conditions were much too

imprecise. The measures were not reported to an anatomical reference frame. Due to this imprecision, it was strictly impossible to provide clinicians with reference values allowing them to position their patients in relation to a population considered as statistically “normal”. So, we decided to study and publish clinical stabilometry standards; we thought that French people alone needed these standards at the time. Under the leadership of JB Baron, indeed, French people had shown interest in the possibility of curing functional postural disorders by playing on changes in the regulation of tonic postural activity obtained by manipulations of the information from various sensors of the postural system. But these postural disorders were functional, they did not correspond to any known lesions of the central nervous system, yet their objectivity was statistically indisputable, everywhere in the world, patients suffering from these disorders say the same thing with the same words, this intersubjectivity on a large-scale founds the objectivity of these postural functional syndromes.

When the clinician faces a single patient presenting these subjective complaints, conventionally recognized but unverifiable for this particular patient, it is understandable that the clinician wishes to have an instrument that reduces the importance of his own subjective approach and promotes an objective approach in an area so influenced by subjectivity. The ‘Association Française de Posturologie’ has produced

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and published a comprehensive body of standards for clinical stabilometry, covering all possible areas: metrology⁽²⁾, recording conditions, signal analysis, reference values obtained in these specific conditions⁽³⁾, repeatability of the parameters^(3,4). At the Amsterdam congress (1986) we gave professor Tokita the document, 'Normes85' and heard that he had had the same idea as us! In 1983 the Japanese magazine 'Equilibrium Research' had published a document setting the recording conditions.⁽⁵⁾ Japanese Industrial standards for building stabilometric platforms were published in 1987⁽⁶⁾ and the reference values were investigated by the manufacturer of 'Anima' brand platforms.⁽⁷⁾

In France, Normes85⁽³⁾, was successful. Manufacturers understood its interest and provided clinicians with the appropriate hardware. Clinicians have seen in these platforms not only standardized instruments facilitating communication with patients and their referents, but also the basis for a common language, based on the rigor of biomechanics. Numerous clinical research works was carried out under Normes85.

In 1985 in France, few models of computers, the memory capacity of which was limited to 256 Ko, represented the development of computers for personal use. We had chosen "Apple II" and had been able to write a program to collect the signal and analyze it, in a language of that time, the UCSD Pascal, with a frequent use of mass memory. Despite the use of this overlay technique, the signal sampling rate had to be set at 5 Hz and the duration of the recording to 51.2 s. to limit the number of data points to be processed. Very quickly, advances in personal computing have suppressed these restrictions due to the size of the memory and have allowed the signal processing by nonlinear dynamic techniques requiring a large number of data points. The use of a sampling rate at 40 Hz was then introduced, with a platform built by Maurice Ouaknine including technical progress of the sensors as well^(8, 9).

The introduction of this new sampling rate at 40 Hz has raised the question of updating Normes85. Dominic Perennou, President of the French association, decided to undertake this updating and summoned platform builders, French and Russian, to discuss and approve the specifications of a clinical stabilometry platform prepared by the "Laboratoire National de Métrologie et d'Essai"⁽¹⁰⁾ (Platform builders meeting, Paris 9/12/2007). A few months later, the President of the association dissolved the Standards Committee before it could make other decisions.

At our request, during the Congress of Bologna (2009), the President of the ISPGR decided to create a new standards committee of clinical stabilometry. For three years this committee has just made nothing, organized nothing ... Normes85 was becoming increasingly obsolete, while stabilometry was developing beyond the southern European countries, to Brazil and to the South-American continent, so we decided not to wait for international standards and a forum on

line was opened late 2012, for the discussion of new standards for the only countries practicing posturology, that is to say the Latin countries (<http://clinicalstabilometry.freeforums.org>).

Once again the Japanese had had the same idea as us, they expected nothing from this sleepy Committee and Professor Kazuo Ishikawa took advantage of the ISPGR congress he organized in Akita in 2013 to create a third standardization committee; Lorenzo Chiari chaired it. After two years of discussions and meetings, the committee felt it was impossible to enact international standards based on arbitrary decisions. There is, indeed, no evidence to decide rationally on a number of stabilometric practices; why, for example, decide to set the interval between the heels at two and not at ten centimeters?

This decision of not deciding anything is understandable, but it has some logical biases. The major criticism that this decision may be addressed is that it assumes the upright postural control system does exist, though it is only a rational being. What really exists: men standing upright although they are built like inverted pendulums, so basically unstable. Each individual has his own solution to this mechanical problem, using data from his genome but also from his history.

There is not an unique way to stand upright; the upright postural control system does not exist as a model that should be approached to be normal, the necessary and sufficient condition is to stand still without suffering. Designing stabilometry as if it were the means to verify that the upright postural control system of an individual is normal... that's a beginner's mistake we did make! However, it is not forbidden to record individuals in completely arbitrary conditions that have nothing to do with a so-called normal operation of their postural system, just to see how they manage to stand upright under our own conditions. And we know that varying our conditions we discover elements that help us a little to understand how they manage to stand upright.

So, Latin posturologists have decided to reach agreement about the use of arbitrary conditions, accepted by all, not because they correspond to the normal functioning of the postural system but because they can easily be used in clinical practice. The latin posturologists are invited to vote the text of the standards which will be gradually presented on the forum 'Clinical Stabilometry' (<http://clinicalstabilometry.freeforums.org>). After the vote, the reference values of the usual stabilometric parameters will be studied by different teams in different Latin countries.

These standards, Normes13, cannot claim to be international standards, they do not emanate directly from the ISPGR, but they certainly represent interim standards of international interest.

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