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**Procjena osteopatskih kliničkih testova za disfunkciju sakroilijakalnih zglobova/zdjeličnog pojasastabilometrijskim uređajem**

**HIPOTEZA:**

Hipoteza 1. Postoji veza između pacijenata spozitivnimosteopatskimkliničkim testovima za disfunkciju sakrolilijakalnih zglobova/zdjeličnog pojasai njihovog posturalnog statusa u odnosu na one ispitanike s urednim istim tim kliničkim testovima;

Hipoteza2. Pacijenti s pozitivnim standardnim osteopatskim kliničkim testovima za disfunkciju sakroilijakalnog zgloba/zdjeličnog pojasa povezani su s poremećajem posturalnog statusa mjerenog stabilometrijskim uređajem u odnosu na ispitanike s istim tim, ali urednim kliničkim testovima.

**CILJ:**

U osteopatiji, prvoj, temeljnoj i jedinoj holističkoj manualnoj medicinskoj struci, ali i u svim ostalim medicinskim disciplinama, sakroilijakalni zglob (SIZ), odnosno, cjelovitije i biomehanički točnije, zdjelični pojas (ZP) predstavlja jedan od glavnih izvora dijagnostike tjelesnog statusa. U osteopatiji se prikupljaju,ne samo njegove bio-mehaničke, već osobito senzorijalnetaktilne informacije. U ovom istraživanju cilj je procjenanjegovih biomehaničkih karakteristika. Kako SIZ/ZP predstavlja jedno od središta, nerijetko i polazišta, osteopatskog dijagnostičko-terapijskog pristupa i procesa, od presudnog je značaja - vjerodostojna klinička dijagnostika Disfunkcije SIZ/ZP - DSIZ/ZP.

 Unatoč takvom opravdanom zahtijevu, SIZ/ZP je svim svojim anatomskim, biomehaničkim i svekolikim drugim karakteristikama vrlo složena i kompleksna struktura i kao takva predstavlja pravi dijagnostički izazov za sve koji se time bave. Mnogi istraživači, kliničari i razni terapeuti svakodnevno rabe i primjenjuju razne neinvazivne manualne kliničke dijagnostičke testove što imaju za cilj pronaći dis/funkciju SIZ/ZP. (navodi se više od 20opisanih i, u klinički rad stavljenih, testova!). Veliki broj samih testova neizravno pokazuje kako niti jedan test sam po sebi nije dovoljan za vjerodostojnu dijagnozu i sukladno njoj usmjereno liječenje. Svjedoci smo sve većih kritika u svezi točnost i učinkovitost tih testova, a čime su se bavili i neprestano bave mnogi najistaknutiji istraživači i kliničari. Sve je to dovelo do niza različitih i često oprečnih preporuka što unose nemir i nepovjerenje u svakodnevni rad svih kliničara. Većina istraživača se slaže kako se glavni problem u nevjerodostojnosti manualnih testova krije u njihovu različitom isubjektivnom tumačenju.

Iz svega navedenog nametnula se potreba provjere ovih testova objektivnim metodama,najbolje nekim računalnim mjernim uređajem.

Za testiranje DSIZ/ZP u ovom je radurabljen stabilometrijski uređaj - *Balance platform*® (SU-*BP*).

**ISPITANICI I METODE:**

 Izrađena je detaljnametodologijas rigoroznim uključnim i isključnim kriterijima ispitanika za Pokusnui Kontrolnu skupinu, s preciznim protokolom izvođenja mjerenja na vrlo osjetljivom i kompliciranom stabilometrijskom uređaju (SU) i s detaljno razrađenom razmjenom i pohranom podataka za statističku obradu. Stoga nacrt ove studijeodgovara - trostrukoj slijepoj probi.

Izvršenasu ukupno 43 mjerenja, a u statističku obradu ušlo je 40 ispitanika (20 ženskih i 20 muških), starosti 19-66 godina ipodijeljenih u dvije skupine: 1.Pokusna- 22 ispitanika (10 Ž:12 M) i 2. Kontrolna - 18 ispitanika (10 Ž:8 M). Pokusnu skupinu su činili svi onisačetiri ili pet pozitivnih standardnih osteopatskih kliničkih testova za DSIZ/ZP, a kontrolnu svi oni urednih tih istih testova.Za prosudbu je izabrano pet osteopatskih testova za DSIZ/ZP: 1.test fleksijetrupa u stojećem stavu (*forward flexion test in standing*), 2. testfleksijetrupau sjedećem stavu (*forward flexion test in sitting*), 3. tzv. test prekriženih palaca, 4. *Fortin Finger test* i 5. test aktivnog podizanja ispružene noge (*the Active Straight Leg Raise /ASLR/ test*).

Testiranja su u Poliklinici Scipion u Rijeci provela dva ispitivača, neovisno jedan o drugome.Ispitivač A je: 1.vršio testiranja osteopatskim manualnim testovima na, nasumično od strane tajnice poliklinike,poslanimpacijentima,2. ispunjavao zadani anamnestičko-klinički obrazac (strogo vodeći računa o uključno/isključnim kriterijima) i 3. svakog ispitanika šifrirao (14 slovčano-brojčanom šifrom). Tako nitko drugi, a osobito ispitivač B, tajnicai statističarka nisumogli znati u koju skupinu koji od njih pripada. Prema naknadnom rasporedu tajnice, iste je,tako šifrirane ispitanike,ispitivač Bzatim testirao naSU*.*Testiranja su provedna prema standardnom protokolu Međunarodnog posturološkog udruženja (*IPS*): svakog ispitanikatestiralo se dva puta,u trajanju po 60 sekundi: 1. otvorenim i 2. zatvorenim očima i statičkom stojećem stavu.

Za statističku obradu izabrana su samo četiri računalno dobivena rezultata. Dva su bila pokazatelja izmjerenih frekvencija njihanja (srednjih i maksimalnih u odnosu na obje osovine X i Y), druga dva su glavna pokazatelja funkcioniranja sustava posturalne kontrole: 1. ukupna dužina vektora krivulje njihanja (DVKNj.) i 2. ukupna površina/područje što je taj VKNj. tijekom testiranja ispisao/zauzeo (PVKNj.). Testiranja su ukupno trajala 41 dan.

Statistička analiza izvršena je usporedbom pokusne i kontrolne skupine statističkim programskim paketom STATISTICA *version* 13.3©1984-2017 TIBCO*Software Inc*. u Katedri za medicinsku statistiku, epidemiologiju i medicinsku informatiku Škole narodnog zdravlja‘Andrija Štampar’ Medicinskog fakulteta Sveučilišta u Zagrebu.

**ZAKLJUČAK:**

Koliko je do sadanamapoznato, još nije izvršeno niti jedno istraživanje između odnosa disfunkcije sakroilijakalnog zgloba(DSIZ)/zdjeličnog pojasa (ZP) utvrđenog kliničkim testovima rabljenim u osteopatiji i posturalnog statusa osoba u statičkom stojećem stavu testiranog stabilometrijskim uređajem (SU).

Ovim jeistraživanjem utvrđena značajna razlika, razine značajnosti p<0,01, u pokazateljima dužinivektora krivulje njihanja i površini vektora krivulje njihanja u oba mjerenja, otvorenim (o/o) i zatvorenim očima(z/o). Obzirom da su to dva temeljna iglavna pokazatelja posturalne kontrole ispitanika i dokazana su u oba mjerenja (o/o i z/o), smatramo kako smo u potpunosti i s visokim koeficijentom značajnosti (P<0,01) potvrdili hipotezu ovog istraživanja kako su pozitivni klinički testovi što se rabe u standardnom osteopatskomneinvazivnom kliničkom pregledu pacijenata s DSIZ/ZP povezani sa značajnim poremećajem, smanjenjem njihovatakvog posturalnog statusa u odnosu na pacijente s istim tim, ali urednim kliničkim testovima.

 Ovakav pozitivan rezultat potvrđuje kako su se, iako uglavnom kritizirani kao nevjerodostojni, osteopatski klinički testovi za DSIZ/ZP pokazali vjerodostojni uspoređeni s kontrolnom skupinom s istim tim urednim testovima u odnosu na posturalni status mjeren preciznim SU. To znači kako DSIZ/ZP ima značajan utjecaj i na posturu tijela i da je isti moguće izmjeriti SU.

 Sukladno tome, ovim smo istraživanjem utvrdili: 1. opravdanost za nastavak uporabe svih pet ovdje testiranih neinvazivnih kliničkih osteopatskih testova za DSIZ/ZP u svakodnevnom kliničkom radu, 2. novu mogućnost dijagnostike DSIZ/ZP uz pomoć SU (što zahtijeva posjedovanje /skupocjenog/ SU i odgovarajuću edukaciju ispitivača za rad s takvim SU) i 3. otvorili nove perspektive za ev. buduća istraživanja odnosa disfunkcije/a i nekih drugih dijelova sustava za kretanje i posturalnog tjelesnog statusa.

**ABSTRACT**

**OBJECTIVE:**

 In osteopathy, which is the first, basic and only holistic manual medical profession, and in all other medical disciplines, the sacroiliac joint (SIJ) i.e. more completely and biomechanically more accurately referred to as the pelvic girdle (PG), represents one of the principal diagnostic sources of the physical status. In the practice of osteopathy both not only its biomechanical, and especially, the sensorial and tactile information of the pelvic girdle are being collected. In this research, the objective is to assess its mainly biomechanical characteristics of the sacroiliac joint and the pelvic girdle. Given that SIJ/PG represents one of the centers and, quite often, the starting points of osteopathyc diagnostic-therapeutic approach and process, the reliable clinical diagnosis of SIJ/PG dysfunction (DSIJ/PG) is of the primary importance.

 In spite of such justifiable request, SIJ/PG due to by all its anatomical, biomechanical and other characteristics is a very complex structure which, as such, represents a real diagnostic challenge for all to practitioners. Many researchers, clinicians and various therapists apply, on a daily basis, different non-invasive manual clinical diagnostic tests with the purpose of determining the (dys)function of SIJ/PG (more than twenty described and clinically applied tests have been described!). The existence of a large number of tests indirectly proves that none of these tests, taken separately, is sufficient to make a reliable diagnosis and to determine the appropriate treatment based on such a diagnosis. We are witnessing an increasing criticism towards regarding the accuracy and efficiency of such tests, which have been and which still are the field of interest of to many eminent researchers and clinicians. All that led to a series of diverse and many times contradictory recommendations which brought restlessness unease and a lack of confidence in these tests by the trust in everyday work of all practicing clinicians. The majority of the researchers agree that the main problem related to the unreliability of manual tests actually lies in their diverse subjective interpretation.

 Therefore, a need arose verify those tests by non-subjective methods, preferably by some measuring device.

 In this research, the dysfunction of SIJ/PG has been tested by stabilometric device - *Balance platform*®.

**SUBJECTS AND METHODS:**

 A detailed methodology has been developed with rigorous inclusion / exclusion criteria of the participants who were classiffied into an Experimental Testing Group (participants having 4 or 5 positive ostheopatic clinical tests for DSIJ) and Control Group (healthy subjects), with precise protocol of measurement on a very sensitive and complicated stabilometric device enabling data exchange and storage, thus facilitating statistical processing. Therefore, the draft of This research corresponds to an experimental triple blind study.

 The total of 43 measurements have been performed. The statistical processing included 40 participants (20 female (F) and 20 male (M), of 19-66 years of age), divided into two groups: 1. Testing Experimental Group - 22 participants (10 F : 12 M) and 2. Control Group - 18 participants (10 F : 8 M). The Testing Experimental Group comprised of the participants having 4 or 5 positive ostheopatic clinical tests for DSIJ/PG. Theparticipants in the Control Group was comprised with the participants with normal results on the same tests.

 For the assessment, five osteopathic tests for DSIJ/PG have been selected: 1. Forward flexion test in standing, 2. Forward flexion test in sitting, 3. Crossed thumbs test, 4. Fortin Finger test and 5. the Active Straight Leg Raise /ASLR/ test. The tests were performed in Polyclinic Scipion in Rijeka by two examiners, independent one of another.

Examiner A: 1. performed the tests by osteopathic manual tests on the participants who were randomly selected patients which was done directed by the secretary of the polyclinic, 2. filled in the anamnestic-clinical form (paying special attention to the on inclusion / exclusion criteria) and 3. provided an encryption code for each and every participant (by 14 letter-numeric code). In such way, no one else, and especially Examiner B, secretary and statistician, could know to which group a particular respondent belonged. Following that, according to the secretary’s schedule, the coded respondents have been tested by the other examiner, Examiner B on the stabilometric device - *Balance Platform®.* The testing has been performed according to the standard protocol of the International Association of Posturology: each participant has been tested twice, for the duration of 60 seconds: 1. with open and 2. with closed eyes. The statistical processing included 4 computer-elected results: two measuring the frequency of sway (middle and maximal in relation to both axis X and Y) and two major indicators of the postural control system functioning: 1. the total length of the sway curve vector and 2. total surface / area which such sway curve vector occupied during the testing. The testings lasted for 41 days (6 weeks).

 The statistical analysis was made by comparing the testing and the control group by statistical program package STATISTICA *version* 13.3©1984-2017 TIBCO *Software Inc*. by the Department of medical statistics, epidemiology and medical informatics of the Public Health School “Andrija Štampar” - Medical Faculty of the University of Zagreb.

**CONCLUSION:**

 As far as we are aware, no research has been performed so far concerning the relation of the dysfunction of the sacroiliac joint (DSIJ) / pelvic girdle (PG) determined by clinical tests used in osteopathy and postural status of persons in static standing position tested by a stabilometric device.

 This research shows significant difference, of significance level p<0,01, in the indicators: length of the sway curve vector and area of the sway curve vector in both measurements with eyes opened (e/o) and eyes closed (e/c). Given that those are two main and basic indicators of postural control of the participants and given that they have been proven in both measurements (e/o and e/c), we hold that we have fully and with high significance coefficient (P<0,01) confirmed the hypothesis of this research that the positive clinical tests which are used in standard osteopathic non-invasive clinical examination of a patient with DSIJ/PG are related to significant disturbance / decrease of postural status as compared to the patients with normal / negative results on the same clinical tests.

 The statistically significant results confirm that despite being subject to the criticism as being unreliable, the osteopathic clinical tests for DSIJ/PG have been proven reliable compared with postural status measured on a precise stabilometric device, with regard to the control group having normal results on the same tests. This further means that dysfunctional sacroiliac joint (DSIJ/PG) has a significant influence on the posture of the body and that it can be measured by stabilometric device.

 Therefore, through this research: 1. we have justified the continued use of all five non-invasive clinical osteopathic tests for DSIJ/PG in everyday clinical practice, 2. we have established the possibility to diagnose DSIJ/PG by stabilometric device (which requires having the expensive stabilometric device and the appropriate education of the examiner to use such stabilometric device), and 3. we have opened the new perspectives for potential future researches of the dysfunction of other parts of the mobility locomotor system and the postural system physical status.