

Povzetek strokovnega prispevka MI-2010 ■

Hitro odzivno neinvazivno zaznavanje dihanja za uporabo v terapevtskih in diagnostičnih aplikacijah

Rapid Responsive, Non-Invasive Breathing Detection System to be Used in Theapeutic and Diagnostic Applications

Organizacije avtorjev: Labena Razvoj in Raziskave, Labena Skupina d.o.o. (ML, MM), Temza d.o.o. (DA), Laboratorij za Biokibernetiko, Fakulteta za Elektrotehniko, Univerza v Ljubljani (ML), Fakulteta za Farmacijo, Univerza v Ljubljani (MR), Univerzitetni Klinični Center Ljubljana (MMP).

Kontaktna oseba: Matevž Leskovšek, Labena Skupina d.o.o., Verovškova ulica 64, SI-1000 Ljubljana. e-naslov: matevz.leskovsek@gmail.com.

Matevž Leskovšek, Dragomira Ahlin, Maja Marija Potočnik, Matjaž Ravnikar, Marko Marc

Povzetek

Predstavili bomo sistem za zaznavanje dihanja za uporabo pri oddaljenem vodenju in nadzoru bolnikovega izvajanja dihalnih vaj za astmatike,^{1,4} za bolnike s povišanim krvnim tlakom⁵⁻¹⁰ in za biofeedback regulacijo somatskega stanja pri osebah z anksioznimi in stresnimi motnjami.¹¹⁻¹⁵ Sistem za hitro odzivno zaznavanje dihanja je sestavljen iz štirih visoko odzivnih akustičnih mikrofonov ter računalniškim programom, ki izvaja sledeče korake: fazno odštevanje signalov za izločanje okoljskega hrupa, določanje posameznega izdiha, določanje relativne moči in dolžine posameznega izdiha in določanje trenutne periode in njen odklon od srednje vrednosti predhodnih period. Vsi ti podatki se nato posredujejo terapevtski biofeedback aplikaciji, ki v realnem času izvaja vizualni in zvočni odziv, ki bolnika spodbuja k dihanju v dolgih in enakomernih periodah in dihanju z podaljšanimi izdihi, t.j. čimdaljšimi izdihi relativno glede na povprečno periodo dihanja.

Literatura

1. Bowler SD, Green A, Mitchell CA: Buteyko breathing techniques in asthma: a blinded randomised controlled trial. *Med J Aust* 1998; 169(11-12):575-8.
2. Cowie RL, Conley DP, Underwood MF, Reader PG: A randomised controlled trial of the Buteyko technique as an adjunct to conventional management of asthma. *Respir Med* 2008; 102(5):726-32.
3. Slader CA, Reddel HK, Spencer LM, Belousova EG, Armour CL, Bosnic-Anticevich SZ, Thien FC, Jenkins CR: Double blind randomised controlled trial of two different breathing techniques in the management of asthma. *Thorax* 2006; 61(8):651-6.
4. McHugh P, Aitchison F, Duncan B, Houghton F: Buteyko Breathing Technique for asthma: an effective intervention. *N Z Med J* 2003; 116(1187):U710.

5. Grossman E, Grossman A, Schein MH, Zimlichman R, Gavish B: Breathing-control lowers blood pressure. *J Hum Hypertens* 2001; 15(4):263-9.
6. Bae JH et al.: Effect of Device-guided breathing exercise on blood pressure control: Korean multi-center study. *Korean Hypertension Journal* 2006; 1:19-23.
7. Elliott WJ, Izzo JL: Device-Guided Breathing to Lower Blood Pressure: Case Report and Clinical Overview. *The Medscape Journal of Medicine* 2006; 8(3).
8. Schein MH, Alter A, Levine S, Baevisky T, Nessing A, Gavish B: High Blood Pressure Reduction in Diabetics with Interactive Device-Guided Paced Breathing: Final Results of a Randomized Controlled Study. *Journal of Hypertension* 2007; 25(2):S192.
9. Levent A et al: Device-Guided Paced Breathing Reduces Blood Pressure: Ambulatory and Office Measurements. *Journal of Hypertension* 2008; 26(Suppl): S371-2.
10. Schein MH, Gavish B, Herz M, Rosner-Kahana D, Naveh P, Knishkowsky B, Zlotnikov E, Ben-Zvi N, Melmed RN: Treating hypertension with a device that slows and regularizes breathing: A randomised, double-blind controlled study. *J Hum Hypertens* 2001; 15(4):271-8.
11. Webster MK: Migraine Relief With Biofeedback. <http://www.desertsky.com/files/migraine1.pdf>, 2001.
12. Burke EJ, Andrasik F: Home- vs. clinic-based biofeedback treatment for pediatric migraine: results of treatment through one-year follow-up. *Headache* 1989; 29(7):434-40.
13. Costa A, Bonaccorsi M, Scrimali T: Biofeedback and control of anxiety preceding athletic competition. *International Journal of Sport Psychology* 1984; 15:98-109.
14. Zaichkowsky L, Fuchs C: Biofeedback applications in exercise and athletic performance. *Exercise and Sport Science Review* 1988; 16:381-421.
15. Benner-Davis S, Heaton PC: Attention Deficit and Hyperactivity Disorder: Controversies of Diagnosis and Safety of Pharmacological and nonpharmacological Treatment. *Curr Drug Saf* 2007; 2(1):33-42.

■ **Infor Med Slov:** 2010; 15(supl): 33-34