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Analisis hubungan antara tingkat kesamaptaan jasmani dengan durasi kemampuan bertahan pada latihan bernafas dalam tekanan positif : Studi pada awak pesawat terbang dan penerbang pempur TNI AU menggunakan simulasi Positive Pressure Breathing (PPB) di Lakespra Saryanto Jakarta tahun 2003

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Abstrak

LATAR BELAKANG : Awak pesawat khususnya penerbang tempur yang bekerja pada kondisi hipobarik akan mudah terpajan hipoksia jika tidak menggunakan perlengkapan Positive Pressure Breathing diatas ketinggian 39.500 kaki dan bila mengalami kondisi emergensi berupa loss of cabin pressurization. Selama melakukan manuver Positive Pressure Breathing akan membutuhkan kekuatan otot-otot ekspirasi, karena kerja otot ekspirasi menjadi aktif. Tingkat kesamaptaan jasmani yang baik diyakini dapat meningkatkan kemampuan latihan Positive Pressure Breathing.
HIPOTESIS : Penelitian ini bertujuan membuktikan kebenaran hipotesis bahwa terdapat hubungan antara tingkat kesamaptaan jasmani A dan tingkat kesamaptaan jasmani B dengan durasi kemampuan latihan Positive Pressure Breathing.
METODE : Pada simulasi latihan Positive Pressure Breathing subyek dipajankan terhadap tekanan 25 mmHg dan diinstuksikan untuk bernafas melawan tekanan tersebut sampai timbul kelelahan, tidak dapat berkomunikasi dan hiperventilasi. Kemampuan subyek pada latihan Positive Pressure Breathing dinilai dengan lamanya durasi bertahan. Tingkat kesamaptaan jasmani subyek dinilai dengan prosedur tes kesamaptaan jasmani yang diberlakukan di TNI AU.
HASIL : Rata-rata tingkat kesamaptan jasmani 67,6 ± 5,6. Rata-rata durasi kemampuan latihan Positive Pressure Breathing 6,77 ± 1,49 detik. Pada analisis multivariate ditemukan adanya hubungan yang sedang antara tingkat kesamaptaan jasmani A (r = 0,285 ; p = 0,05) dan tingkat kesamaptan jasmani B (r = 0,292 ; p = 0,05) dengan durasi kemampuan latihan Positive Pressure Breathing. Repetisi gerakan sit up dalam tes kesamaptaan B memiliki hubungan yang kuat (r = 0,549 ; p = 0,000) dengan durasi kemampuan latihan Positive Pressure Breathing dan repetisi gerakan pull up dalam tes kesamaptaan B memiliki hubungan yang sedang (r = 0,347 ; p = 0,003) dengan durasi kemampuan latihan Positive Pressure Breathing.
KESIMPULAN : Tingkat kesamaptaan jasmani A dan B dapat digunakan untuk memprediksi durasi kemampuan latihan Positive Pressure Breathing pada awak pesawat dan penerbang tempur. Latihan untuk menguatkan otot perut kemungkinan akan dapat mengurangi kelelahan yang terjadi saat melakukan manuver Positive Pressure Breathing.
.....BACKGROUND : Air Crew especially fighter pilots who work in a hypobaric condition shall tend to exposed by hypoxia when flying above 39,000 ft and in an emergency condition such as loss of cabin pressurization if they don't use a Positive Pressure Breathing equipment. During Positive Pressure Breathing maneuver they shall require expiratory muscles strength that become active during this maneuver. Good fitness levels are believed to be able to increase endurance ability on Positive Pressure Breathing training.
HYPOTHESIS : This study aims to define correlation between fitness levels and durations of endurance ability on Positive Pressure Breathing Training.

METHODS : Subjects who underwent to Simulation of Positive Pressure Breathing Training were exposed to 25 mmHg and instructed to resist that they suffered until volitional fatigue, difficulty to communication and hyperventilation. They endurance ability on Positive Pressure Breathing Training was evaluated by measuring the exposure durations. Fitness levels were determined by using a standardized test protocol of Indonesian Air Force.
RESULTS : The mean value of fitness levels 67,6 ± 5,6 . The mean value of duration of endurance ability on Positive Pressure Breathing Training 6,77 ± 1,49 second. With multivariate analysis statistically aerobic fitness level had moderate positive correlation ($r = 0,285$; $p = 0,05$) and statistically muscle fitness level had moderate positive correlation too ($r = 0,292$; $p = 0,05$). Sit up item had a strong correlation ($r = 0,549$; $p = 0,000$) with ability on Positive Pressure Breathing Training durations. Pull up item had a moderate correlation ($r = 0,347$; $p = 0,003$) with ability on Positive Pressure Breathing Training durations.
CONCLUSION : The result indicate that the aerobic and muscle fitness level both can be used to predict duration of endurance ability on Positive Pressure Breathing performed by air crew and Indonesian Air Force fighter pilots. Training to strengthen abdominal muscle may reduce fatique while performing Positive Pressure Breathing maneuver.