

subjects by using near-infrared time-resolved spectroscopy (NIR_{TRS}), which can measure muscle oxygenation quantitatively. Healthy control (CON, $n = 11$) and endurance-trained men (TR, $n = 10$) performed CWE at moderate intensity for 6 minutes. Changes in oxygenated, deoxygenated and total hemoglobin concentration ($\Delta\text{Oxy-Hb}$, $\Delta\text{Deoxy-Hb}$, $\Delta\text{Total-Hb}$, respectively) and changes in muscle O₂ saturation (ΔSmO_2) during CWE in the vastus lateralis were evaluated by NIR_{TRS}. Peak pulmonary oxygen uptake ($\text{VO}_{2\text{peak}}$) was significantly higher in TR than CON (48.8 ± 7.3 mL/kg/min, CON; 63.7 ± 3.6 mL/kg/min, TR; $P < 0.01$). $\Delta\text{Oxy-Hb}$, $\Delta\text{Deoxy-Hb}$, $\Delta\text{Total-Hb}$ and ΔSmO_2 during CWE were significantly greater in TR than CON (all $P < 0.05$). Moreover, $\text{VO}_{2\text{peak}}$ was significantly correlated with the changes ($r = 0.68$, $P < 0.01$, $\Delta\text{Oxy-Hb}$; $r = -0.58$, $P < 0.01$, $\Delta\text{Deoxy-Hb}$; $r = 0.75$, $P < 0.01$, ΔSmO_2), while there was no significant correlation between $\text{VO}_{2\text{peak}}$ and $\Delta\text{Total-Hb}$. In conclusion, muscle oxygenation during CWE was significantly greater in TR than CON. Furthermore, $\text{VO}_{2\text{peak}}$ was significantly correlated with muscle oxygenation during CWE; in subjects with higher $\text{VO}_{2\text{peak}}$, the more Oxy-Hb increased, the more Deoxy-Hb decreased.

P3-39

Orthostatic dizziness in children : a near-infrared spectroscopy study

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Background and aim : Orthostatic dizziness caused by postural tachycardia syndrome and orthostatic intolerance is prevalent in children ; however, its pathology has remained unclear. In this study we aimed to clarify the association between orthostatic dizziness and cerebral circulation.

Methods and findings : A total of 66 adolescents (27 boys and 39 girls) aged 14.3 (13.4–14.9) years old were

included in the study. Their body and cerebral circulation at the first blood pressure dip (initial dip) were analyzed by the active standing-up test using a noninvasive continuous beat-to-beat pressure monitoring system and near-infrared spectroscopy. Thirty-nine adolescents experienced orthostatic dizziness during the active standing-up test (dizziness group) and 27 adolescents did not (non-dizziness group). There was no significant difference between the two groups in body blood pressure, but changes in cerebral oxygenated hemoglobin (Hb) levels were larger in the dizziness group (left : $8.0 [2.3 \text{ to } 10.1]$ $\mu\text{mol/L}$ versus $3.6 [2.5 \text{ to } 7.2]$ $\mu\text{mol/L}$, $p = 0.027$; right : $5.9 [3.5 \text{ to } 10.1]$ $\mu\text{mol/L}$ versus $4.1 [1.7 \text{ to } 6.0]$ $\mu\text{mol/L}$, $p = 0.015$). Circulating plasma volumes were measured in all subjects by 24-hour urinary sodium excretion. There was no statistically significant association between oxygenated Hb level changes and circulating plasma volume indices. Conclusions : Orthostatic dizziness is thought to be caused by dysfunctional autoregulation of cerebral circulation. This may hence be the reason why cerebral circulation did not directly reflect body fluid volume.

P3-40

IIIb (Ph) 型膝損傷に対する内視鏡的膝管ステント留置の適応

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【背景・目的】 3b 型膝損傷には開腹手術による治療が主流である。内視鏡的膝管ステント留置の報告はあるが適応は未だ確立されていない。内視鏡的膝管ステント留置により軽快した 3b (Ph) 型膝損傷例の経験を踏まえ、文献的考察を加味し本法の適応・奏功因子を示す。

【症例】 44 歳女性。総合格闘技試合中に腹部に膝蹴りを受けた。腹痛が持続し翌日病院を受診。腹部 dynamic CT で膝頭部に造影増強効果不良域と周囲の液体貯留を認めた。内視鏡的膝管造影で膝管外漏出像を認め、3b (Ph) 型膝損傷と診断。ENPD tube

を留置し入院。第24病日にENPD tubeを抜去し膝管ステントを留置。経過良好で第43病日に退院。

【考察】 外傷性膝損傷の死亡関連因子として vital signs、輸血量、アシドーシス、合併損傷の有無等が報告されている。これは非手術療法の適応因子としても利用可能であろう。内視鏡的膝管ステント留置の適応条件に「主膝管完全断裂でないこと」が報告されている。本症例は主膝管の完全断裂であるが、「損傷部位を越えてステント留置可能」であった。すなわち、完全断裂であっても損傷部を超えるチューブ・ステント留置が可能であれば保存的治療は可能と判断される。また、膝液ドレナージと膝液漏の制御の正否がその治療効果を左右すると考えられる。

【結語】 3b (Ph) 型膝損傷への内視鏡的膝管ステント留置による奏功例を経験した。その適応や奏功の予測を報告した。

P3-41

Effects of thickness on mechanical behavior of highly crosslinked polyethylene hip implants used in total hip arthroplasty

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Introduction : Highly crosslinked, ultra-high molecular weight polyethylene (HXLPE) has been one of the most promising materials used in total hip arthroplasty (THA). Since crosslinking formulation in polyethylene successfully improved the wear resistance, the use rate of large femoral heads coupled with thin HXLPE acetabular liners has been growing markedly in the last decade in order to avoid the incidence of hip dislocation. Nevertheless, effects of liner thinning remain to be fully elucidated in terms of mechanical safety and performance during in-vivo service. The purpose of this study is to review the thickness effects of HXLPE on mechanical durability in THA.

Methods : We performed an advanced PubMed search of the clinical and scientific literatures published in English

since 2008. Titles and abstracts were screened for “crosslink” “polyethylene”, “hip”, “wear” or “creep”.

Results : Several in-vivo as well as in-vitro studies demonstrated that thickness of HXLPE acetabular liners can greatly affect their mechanical performances. Several theoretical and experimental studies showed that maximum contact stress between femoral heads and acetabular liners increased with liner thinning, leading to significantly-increased risk for creep, wear, and fatigue fracture. According to clinical studies, fracture of HXLPE often occurred in thin acetabular liners with a <5 mm thick as a response to cyclic neck-liner impingement.

Discussion : Although tribological performance dramatically improves by inter-molecular crosslinking, this benefit is known to be achieved as an expense of other mechanical properties (e.g., tensile strength and fracture toughness). Based on the current literature review, we conclude that liner thinning (especially, at <5 mm) is quite detrimental for their long-term mechanical performance in THA.

P3-42

消化管狭窄予防ステント（吸収性）の開発

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【背景】 消化管は炎症の治癒過程で狭窄する。医原的狭窄には、食道がんに対する全周性の内視鏡粘膜下層剥離術 (ESD) 後の狭窄がある。そのためガイドラインでは、2/3周以下にESDに制限を設けている。しかしながら実臨床では全周性に病変が及ぶ例が少なくない。

狭窄の予防にはステントが有用である。我々は手術用吸収糸を用いた吸収性の消化管狭窄予防ステントの開発を試みた。過去に試作したパンスタイプ