RESULTS: Prior to treatment, 90.8% of patients endorsed clinically-elevated pre-treatment somatosensory symptoms. The presence of clinically-elevated somatosensory symptoms decreased after treatment to 77.6%. This demonstrated a high prevalence at admission of somatosensory complaints in patients with TBI which remained high even after completion of TBI treatment.
CONCLUSIONS: Somatosensory symptoms are highly prevalent in TBI patients, but do not appear to correlate to TBI severity. Additionally, there is a strong association between somatosensory symptoms and psychological symptoms. The presence of both somatosensory and psychological symptoms before starting TBI treatment may be considered a strong indicator that somatosensory complaints will persist following completion of a TBI treatment program. Patients that endorse a high degree of psychological symptoms may benefit from targeted behavioral health therapies instead of traditional TBI treatment strategies. Special focus on somatosensory symptoms assessed by NSI may help guide clinical decision-making when treating TBI patients.

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Time Course Of Dermal Anthracene Absorption Utilizing Intradermal Microdialysis

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Polycyclic aromatic hydrocarbons (PAHs) are ubiquitous pollutants encountered through daily exposures, including smoking, vehicular exhaust, industry sources, and occupational settings, such as firefighting. Inhalation has received greatest attention as a major exposure route, with limited data regarding dermal absorption.
PURPOSE: Utilizing the non-carcinogenic PAH, anthracene (ANT), we aimed to assess 1) time course of dermal ANT absorption and 2) effects of local skin temperature on the magnitude of dermal absorption.
METHODS: Two intradermal microdialysis (MD) fibers were inserted in the ventral forearm of 6 healthy participants (32 ± 5 yrs, 5 male, 1 female). MD fibers were perfused with 10% 2-hydroxypropyl-β-cyclodextrin with lactated Ringer's at 1 µl/min. A 2% ANT solution was applied to skin over each MD site with overlying local heaters (LH) housing laser Doppler flowmeters for assessment of skin blood flow (SkBf). LH were clamped at 33°C during baseline dialysate sampling. Following baseline, LH were set to 1) 43°C (Hot, HT) and 2) 33°C as thermoneutral (TN) for the duration of the protocol. Dialysate samples were collected intermittently over 4 hours and 15 minutes, and SkBf, blood pressure and HR were recorded throughout the protocol. Atmospheric pressure chemical ionization tandem mass spectrometry was used to quantify ANT dialysate concentrations.
RESULTS: Preliminary data indicate that no ANT was detected in any baseline samples. From 1h30 to 1h 45 min, ANT was detected in 3 of 6 and 0 of 6 samples for the HT and TN sites, respectively. One HT sample was quantifiable at 317.5 ppb. Sampling from 4h to 4h 15 min, ANT was detected in all samples at the HT site and quantified in one (344.9 ppb). ANT was detected in only 1 of 6 samples at the TN site during this sampling period. SkBf was significantly higher at HT versus TN at both 1h 45 min (8.7 ± 5.7 and 29.2 ± 20.5 CVC%$_{max}$, $P<0.05$) and 4h 15min (12.8 ± 8.3 and 42.8 ± 22.3 CVC%$_{max}$, $P<0.05$).
CONCLUSIONS: Preliminary data indicate that dermal absorption and recovery of the PAH anthracene is increased when skin is heated versus thermoneutral, increasing over time. This has potential implications for dermal absorption of contaminants in individuals working in the heat. These data also suggest that microdialysis may be an effective method of assessing dermal absorption of PAHs.

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Evaluation Of Surgical N95 Respirators Covered With Combinations Of Masks And Face Shield

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ABSTRACT: Limited availability of filtering facepiece respirators (FFRs) during extreme demand has prompted users to cover their N95 FFRs with another face covering to prevent surface contamination and extend its their useful life.
PURPOSE: To evaluate the metabolic demands and internal breathing environments from covering an N95 with a surgical mask (SM), cloth mask (CM), and/or face shield (FS).
METHODS: Three NIOSH-approved N95 models (cup (2) and trifold (1)) were evaluated as a control (N95 only) while covered under five conditions (SM, CM, FS, SM+FS, and CM+FS) using the NIOSH Automated Breathing and Metabolic Simulator. Every N95 was sealed to the Simulator head form for all trials. All conditions used one trial with each N95 for six incremental 5-minute work rates (oxygen consumption = 0.5, 1.0, 1.5, 2.0, 2.5, 3.0 liters per min STPD). Inhaled oxygen and carbon dioxide concentrations, peak inhaled and exhaled pressures, inhaled wet bulb and dry bulb temperatures were measured continuously and averaged across all work rates and covering conditions. Main effects of the six work rates, six covering conditions, and their interaction were examined using repeated measures ANOVA. Pairwise comparisons of the mean metabolic variable across all work rates were made between the N95 only to each covering condition.
RESULTS: Significant omnibus main effects for work rate, covering condition, and interactions were found for all variables ($p \leq 0.01$ for all). Table 1 presents the mean pairwise differences across all work rates between the N95 condition and each covering condition for all variables.
CONCLUSIONS: Results suggest that metabolic demands and internal breathing environments are significantly impacted by all combinations of coverings tested when compared to N95 only. However, no differences observed were of large enough magnitude to be clinically concerning. It remains unclear if these differences would be perceived by wearers.

Table 1 – Pairwise comparisons of mean breathing differences in N95 only to all other conditions

	N95 + SM	N95 + CM	N95 + FS	N95 + SM + FS	N95 + CM + FS
Inhaled O2 (%)	1.28±0.03	0.59±0.03	-0.52±0.03	-0.20±0.03	-0.26±0.03
Inhaled CO2 (%)	-1.17±0.02	-0.47±0.02	0.48±0.02	0.18±0.02	0.21±0.02
Peak Inhaled Pressure (mmH_20)	-1.35±0.08	-0.99±0.08	1.91±0.08	-0.07±0.08	-0.59±0.08
Peak Exhaled Pressure (mmH_20)	1.01±0.07	1.03±0.07	-1.21±0.07	0.40±0.07	0.39±0.07
Inhaled Wet Bulb Temp (◦C)	-0.29±0.02	0.03±0.02	1.25±0.02	0.31±0.02	0.46±0.02
Inhaled Dry Bulb Temp(◦C)	0.21±0.02	0.19±0.02	1.57±0.02	0.42±0.02	0.66±0.02

Shaded cells indicate a statistically significant difference from the N95 only condition ($p<0.05$).
Abbreviations: SM = surgical mask, CM = cloth mask, FS = face shield.