Foxes Propose New Guidelines for Henhouse Design: Comments on NISO’s Proposed Open Access Metadata Standards

Paul Royster
University of Nebraska-Lincoln, proyster@unl.edu

Follow this and additional works at: http://digitalcommons.unl.edu/libraryscience
Part of the Cataloging and Metadata Commons, Scholarly Communication Commons, and the Scholarly Publishing Commons

Royster, Paul, "Foxes Propose New Guidelines for Henhouse Design: Comments on NISO's Proposed Open Access Metadata Standards" (2014). Faculty Publications, UNL Libraries. 316.
http://digitalcommons.unl.edu/libraryscience/316

This Article is brought to you for free and open access by the Libraries at University of Nebraska-Lincoln at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Faculty Publications, UNL Libraries by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.
Foxes Propose New Guidelines for Henhouse Design: Comments on NISO’s Proposed Open Access Metadata Standards

Paul Royster
Foxes Propose New Guidelines for Henhouse Design: Comments on NISO’s Proposed Open Access Metadata Standards

Paul Royster Coordinator of Scholarly Communication, University of Nebraska-Lincoln Libraries

Author’s Note:

This commentary is in response to: NISO RP-22-201x, Open Access Metadata and Indicators (draft for comment), which is available at: http://www.niso.org/apps/group_public/document.php?document_id=12047

NISO is the National Information Standards Organization, a non-profit industry organization whose mission statement reads: “NISO fosters the development and maintenance of standards that facilitate the creation, persistent management, and effective interchange of information so that it can be trusted for use in research and learning.”

Their recently-issued proposed guidelines for new metadata fields to be attached to scholarly works purport to address and clarify issues of access and re-licensing surrounding the electronic distribution of journal articles. Briefly, they propose to add two fields to the standard metadata: one called “free to read” to identify documents that may be accessed without restriction or registration, and a second called “license_ref” to point users to a uniform resource identifier (URI) that will purportedly explain the re-use terms that apply to the document in question.

The draft proposal is not long—18 pages—and is thankfully plain-language and not overly technical. NISO is to be complimented for that.

The first problem with the proposal, though, and in many ways the root of the subsequent ones, is the composition of the 16-member working or advisory group. It is overwhelmingly made up of publishers, publishing consultants, and publisher associations. There is a single representative of an American library (Indiana University), two from British libraries (Wellcome Library and University of Birmingham Library), and one from a British library association (JISC). The representative of the American library organization (SPARC) is actually the owner of a publishing consulting company (ScholarNext). There is no one to represent the interests of the potential users, the faculty authors, or the institutional disseminators of the content.

In fact, the group contains 75% representatives of publishers and publishing services, many of whom have opposed, misrepresented, and sought to limit legitimate fair use of published materials. The publishers include American Chemical Society, Reed Elsevier, Public Library of Science, International Association of STM Publishers, and Social Science Research Network; publisher services companies include Copyright Clearance Center, Creative
Commons, CrossRef, Ex Libris, Inc., EDItEUR, and Kennisland. They have been offered a seat at the table while the writers and researchers who create and use scholarship have not. This has the appearance of a self-interested cabal setting up standards that further entrench their control over content on which they have managed to secure a near monopoly.

Propagation of the standards lends an unearned aura of credibility, legitimacy, and authority to untested publisher claims of ownership or proprietorship. It also threatens to marginalize non-commercial and non-traditional publishers or disseminators of scholarly content. The guidelines are targeted at a relatively narrow (but profitable) band of communication, where content purportedly owned or licensed by large publishers is furnished to libraries and faculty, conceived only as passive recipients. Adoption of the proposed practices would only further normalize the institutionalized theft of intellectual property from the creators and originators of knowledge, who remain subject to the predatory and monopolistic practices of the majority of these guideline writers.

**“free to read”**

While this designation makes some sense in the narrow universe of subscription, hybrid, and gold OA journals publication, it does not address the myriad of forms in which scholarly content exists online. “Free to read” is defined as “accessible to anyone with an internet connection and without registration.”

So public domain works in Google Books would not qualify (sign-in is required). Nor would pdf files from the National Academies Press website (which requires log-in for pdf’s), though their low-res non-log-in-requiring page-by-page .gif files theoretically would. What about works that can be accessed only as page images and only a page at a time, such as those in the Library of Congress’s American Memory project? These would seem to qualify *sensu stricto*, but how would the attribute be attached or applied. Works in Hathi Trust, or the Internet Archive might or might not. A 400 Mb file from the Internet Archive might be theoretically accessible to someone with dial-up access to the internet, but in practice—not so much.

**“license_ref”**

More disturbing is the "license_ref" attribute, purporting to clear up the murky waters of re-use rights. Publishers frequently misunderstand, misstate, or misrepresent the rights they hold over academic materials. Springer, for example, labels articles authored by US government employees as "Copyright US Government," which is an impossibility and an absurdity. Elsevier and others frequently publish without a copyright statement other than "Published by Elsevier"; this is purportedly done when some or all coauthors have declined or failed to sign the copyright transfer agreement. Many publishers commonly place a copyright ownership statement on materials that are public domain (see Figures 1–8, Appendix). In practice, copyright statements are routinely placed by copy-editors who have little or no understanding of copyright law or knowledge of the specific transfer agreements. It is also common practice for copyright to be settled on or remain with the author(s), while all publication, dissemination, and re-use rights are held by the publisher. Copyright transfer agreements are frequently 10 or more pages of single-spaced fine print. The “license_ref” attribute will do little to sort out this mess, and it will, in fact, lend greater credence and assumed authority to mistaken, misguided, or fraudulent claims of ownership.

A further complication to the “license_ref” attribute is that the re-use rights granted by various publishers differ so widely in what is granted to various classes of users and for various versions of material. With some publishers, a work may or may not be disseminated by the institution based on whether that institution has a policy mandating accessible dissemination. For ACS, the institution must have a mandate; for Elsevier, it must not—and both these publishers are represented in the working group.

Moreover, while most commercial publishers have declared policies regarding accessible re-use of materials they have published, many scholarly societies, university presses, and smaller publishers have not. Certainly, this is an inconvenience to repository managers and authors seeking to provide access to their materials, but the adoption of the proposed NISO standard will do little to address this issue.
Yet another complication is the frequent discrepancy between the stated policies of publishers regarding reuse and the actual rights granted or transferred by contract. Several publishers have issued re-use and author posting policies that flatly contradict the terms of their standard author agreements, in all cases claiming controls over reuse licenses that have no legal or contractual basis.

Further, the idea that an attribute referring to a licensing URI will persist over the long term or point to the same content over time is either innocent or absurd. To believe that the era of publisher acquisition and consolidation is ended is naïve; and online resources, even uniquely identified ones, often do not persist beyond the next website redesign or revision or software update. Today’s URI is next year’s Error 404.

Frankly, the publishers need to put their house in order before presuming to prescribe new metadata standards that will perpetuate their uneven and self-serving administration of the rights they have wrested from the academic laboring class. Enshrining their sometimes questionable claims in dedicated metadata fields would be good business practice for them, but not for those who want to see scholarly communication conducted on more equitable and fairly competitive terms.

A further issue is that these proposed metadata standards raise the bar for small-scale, start-up, and occasional publishing efforts—such as those from university libraries, departments, centers, or student organizations. Not all publishers have the expertise or the infrastructure to comply with the standards and practices recommended by NISO. This appears to be yet another occasion where the promotion of "open access" has become the sheep’s clothing under whose guise non-standard, non-commercial, and innovative publishing models are pushed beyond the pale of acceptability or feasibility. The standards proposed here are another example of an existing monopolistic profit-based cabal of large commercial publishers (and their sometimes unwitting allies) asserting control over the language and practice of academic discourse.

I urge the NISO organization to re-think its objectives, means, and priorities here, and to open up the discussion to those stakeholders whose interests were ignored or suppressed.
APPENDIX

Figure 1. Journal of the American Water Resources Association
Note that the American Water Research Association both claims to own the copyright to this article and simultaneously admits that it is in the public domain.

ESTIMATION OF EVAPOTRANSPIRATION ACROSS THE CONTERMINOUS UNITED STATES USING A REGRESSION WITH CLIMATE AND LAND-COVER DATA

Word E. Sanford and David L. Selnick

ABSTRACT: Evapotranspiration (ET) is an important quantity for water resource managers to know because it often represents the largest sink for precipitation (P) arriving at the land surface. In order to estimate actual ET across the conterminous United States (U.S.) in this study, a water-balance method was combined with a climate and land-cover regression equation. Precipitation and streamflow records were compiled for 888 watersheds for 1971-2000 across the U.S. to obtain long-term estimates of actual ET. A regression equation was developed that related the ratio ET/P to climate and land-cover variables within those watersheds. Precipitation and temperatures were used from the PRISM climate dataset, and land-cover data were used from the USGS National Land Cover Dataset. Results indicate that ET can be predicted relatively well at a watershed or county scale with readily available climate variables alone, and that land-cover data can also improve those predictions. Using the climate and land-cover data at an 800-m scale and then averaging to the county scale, maps were produced showing estimates of ET and ET/P for the entire conterminous U.S. Using the regression equation, such maps could also be made for more detailed state coverages, or for other areas of the world where climate and land-cover data are plentiful.

(KEY TERMS: evapotranspiration; hydrologic cycle; precipitation; streamflow.)

Sanford, Ward E. and David L. Selnick, 2012. Estimation of Evapotranspiration Across the Conterminous United States Using a Regression with Climate and Land-Cover Data. Journal of the American Water Resources Association (JAWRA) 49(1): 217-230. DOI: 10.1111/jawr.12010

INTRODUCTION

Evapotranspiration (ET) is a major component of the hydrologic cycle, and as such, its quantity is of major concern to water resource planners around the world. The long-term average quantity of water available for human and ecological consumption in any region is roughly the difference between the mean annual precipitation and mean annual ET (Postel et al., 1996) with the latter frequently a majority fraction of the former. Thus, quantifying ET is critical to quantifying surface runoff to reservoirs or recharge to aquifers (Healy and Scanlon, 2010). Quantifying ET is also critical for studies of ecosystem water balances (Sun et al., 2011a) and regional carbon balances (Sun et al., 2011b).

In spite of the critical nature of this hydrologic component, its measurement on regional to continental scales has been problematic. Measurement of ET, although possible directly at the land surface (e.g., Stannard, 1988), is usually made either indirectly by...
**Figure 2. Wetlands**

Springer declares copyright in the name of the “U.S. Government,” but the U.S. government cannot hold a copyright by virtue of authorship or creation. There is no copyright in this document; it cannot belong to anyone because it does not exist.

---

**Foraging Habitat for Shorebirds in Southeastern Missouri and its Predicted Future Availability**

Daniel J. Twedd

Received: 1 August 2012/Accepted: 11 April 2013/Published online: 27 April 2013 © US Government 2013

**Abstract** Water management to protect agriculture in alluvial floodplains often conflicts with wildlife use of seasonal floodwater. Such is the case along the Mississippi River in southeastern Missouri where migrating shorebirds forage in shallow-flooded fields. I estimated the current availability of habitat for foraging shorebirds within the New Madrid and St. Johns Basins based on daily river elevations (1943-2009), under assumptions that shorebirds forage in open habitat with water depth <1.5 cm and use mudflats for 3 days after exposure. The area of shorebird foraging habitat, based on replicated 50-year random samples, averaged 975 ha per day during spring and 33 ha per day during fall. Adjustments to account for habitat quality associated with different water depths, duration of mudflat exposure, intra-seasonal availability, and state of agricultural crops, indicated the equivalent of 494 ha daily of optimal habitat during spring and 11 ha during fall. Proposed levees and pumps to protect cropland would reduce shorebird foraging habitat by 80% to 211 ha (10% optimal ha) per day during spring and 9 ha (＜3 optimal ha) per day during fall. Alternative water management that allows natural flooding below a prescribed elevation would retain nearly all existing shorebird foraging habitat during fall and about 60% of extant habitat during spring.

**Introduction**

For centuries, mankind has recognized that the fertile soils of alluvial floodplains yield abundant crops. However, farming bottomlands is risky as untimely flooding may destroy planted crops. Thus, prophylactic measures, such as levees, dams, and canals, have often been undertaken to protect alluvial farmland from flooding while crops are present. Conflicts arise when wildlife or other ecological processes are adversely impacted by these flood mitigation efforts. Recognizing that long-term environmental benefits result from alluvial flooding (Bayley 1995), flood control advocates are increasingly seeking compromises that provide socio-economic benefits for agriculture yet still retain some of the benefits afforded by a natural flood regime (Poff et al. 1997).

Along these lines, I sought to evaluate the impact on wildlife habitat of different water management scenarios associated with proposed flood control along the Mississippi River in southeastern Missouri, USA. I developed and applied a robust methodology to assess the current availability of shorebird foraging habitat associated with historical variation in river elevation. This same methodology was used to predict future availability of shorebird foraging habitat under different water management scenarios that could be employed after flood control measures are implemented. This affords planners an effective method to evaluate the tradeoffs between flood control for agriculture and the resultant availability and quality of wildlife habitat.

Extensive earthen levees that confine rivers within their batters (i.e., the alluvial land between low-water stage and the levees) and other flood control measures were implemented along the Mississippi River and its tributaries after record flooding in 1937 (Stevens et al. 1975). As a result levees are now present along most of lower Mississippi River (Nunnally et al. 1987). In addition, a
Improved mapping of National Atmospheric Deposition Program wet-deposition in complex terrain using PRISM-gridded data sets

Natalie E. Latysh · Gregory Alan Wetherbee

Received: 27 September 2010 / Accepted: 14 March 2011 / Published online: 8 April 2011
© Springer Science+Business Media B.V. (outside the USA) 2011

Abstract High-elevation regions in the United States lack detailed atmospheric wet-deposition data. The National Atmospheric Deposition Program/National Trends Network (NADP/NTN) measures and reports precipitation amounts and chemical constituent concentration and deposition data for the United States on annual isopleth maps using inverse distance weighted (IDW) interpolation methods. This interpolation for unsampled areas does not account for topographic influences. Therefore, NADP/NTN isopleth maps lack detail and potentially underestimate wet deposition in high-elevation regions. The NADP/NTN wet-deposition maps may be improved using precipitation grids generated by other networks. The Parameter-elevation Regression on Independent Slopes Model (PRISM) produces digital grids of precipitation estimates from many precipitation-monitoring networks and incorporates influences of topographical and geographical features. Because NADP/NTN ion concentrations do not vary with elevation as much as precipitation depths, PRISM is used with unadjusted NADP/NTN data in this paper to calculate ion wet deposition in complex terrain to yield more accurate and detailed isopleth deposition maps in complex terrain. PRISM precipitation estimates generally exceed NADP/NTN precipitation estimates for coastal and mountainous regions in the western United States. NADP/NTN precipitation estimates generally exceed PRISM precipitation estimates for leeward mountainous regions in Washington, Oregon, and Nevada, where abrupt changes in precipitation depths induced by topography are not depicted by IDW interpolation. PRISM-based deposition estimates for nitrate can exceed NADP/NTN estimates by more than 100% for mountainous regions in the western United States.

Keywords PRISM · Atmospheric wet-deposition · Precipitation · National Atmospheric Deposition Program

Introduction

A lack of detailed climatic and chemical depositional data for mountainous regions in the United States complicates estimation of the effects of atmospheric deposition from anthropogenic and
Comparative responses to endocrine disrupting compounds in early life stages of Atlantic salmon, *Salmo salar*

T.A. Duffy,¹,* L.R. Iwanowicz,² S.D. McCormick⁴

¹ USGS, Conte Anadromous Fish Research Center, 1 Migratory Way, Tariffs Falls, MA 01276, United States
² USGS, Leventon Science Center, Fish Health Branch, 11649 Leventon Road, Kewauneeville, WI 54940, United States

**A R T I C L E   I N F O**

Article history:
Received 21 January 2014
Received revised form 13 March 2014
Accepted 19 March 2014
Available online: 28 March 2014

Keywords:
Endocrine disruptor
Estriol
Norgestimate
Atlantic salmon
Vitellogenin
Life stage

**A B S T R A C T**

Atlantic salmon (*Salmo salar*) are endangered anadromous fish that may be exposed to feminizing endocrine disrupting compounds (EDCs) during early development, potentially altering physiological capacities, survival and fitness. To assess differential life stage sensitivity to common EDCs, we carried out short-term (4 day) exposures using three doses each of 17α-ethinylestradiol (EE2), 17β-estradiol (E2), and norgestimate (NP) on four early life stages: embryos, yolk-sac larva, feeding fry and 1 year old smolts. Differential response was compared using vitellogenin (Vtg, a precursor egg protein) gene transcription. Smolts were also examined for impacts on plasma Wg, cortisol, thyroid hormones (T3/T4) and hepato-somatic index (HSI). Compound-related mortality was not observed in any life stage, but Wtg mRNA was elevated in a dose-dependent manner in yolk-sac larva, fry and smolts but not in embryos. The estrogens EE2 and E2 were consistently stronger inducers of Vtg than NP. Embryos responded significantly to the highest concentration of EE2 only, whereas older life stages responded to the highest doses of all three compounds, as well as intermediate doses of EE2 and E2. Maximal transcription was greater for fry among the three earliest life stages, suggesting fry may be the most responsive life stage in early development, Smolt plasma Wg was also significantly increased, and this response was observed at lower doses of each compound than was detected by gene transcription suggesting plasma Wg is a more sensitive indicator at this life stage. HSI was increased at the highest doses of EE2 and E2, and plasma T3 was decreased at the highest dose of EE2. Our results indicate that all life stages are potentially sensitive to endocrine disruption by estrogenic compounds and that physiological responses were altered over a short window of exposure, indicating the potential for these compounds to impact fish in the wild.

© 2014 Published by Elsevier B.V.

1. Introduction

Environmental contaminants are potentially one of several factors that contributed to the decline of Atlantic salmon (*Salmo salar*) on the east coast of North America, and may currently play a role in poor recruitment success and restoration of this species (Fairchild et al., 1999). In particular, endocrine disrupting compounds (EDCs) are an increasing concern for wildlife, since population-level impacts of these compounds have been documented (Kidd et al., 2007; Lange et al., 2011; Blazer et al., 2012). Endocrine disrupting compounds are most often associated with municipal and industrial wastewater effluent, can feminize male fish in receiving waters (Sumpter, 2005; Desbrow et al., 1998; Blazer et al., 2007), and lead to local extinction (Kidd et al., 2007).

Two of the most prevalent estrogenic compounds in rivers and estuaries include the natural steroid, 17β-estradiol (E2), and a synthetic estrogen, 17α-ethinylestradiol (EE2) (Desbrow et al., 1998). Plasticizers such as 4-nonylphenol (NP) are also present in effluents, and act as weak feminizing compounds in fish (Servos et al., 2003). Routine wastewater treatment does not completely remove these compounds (Johnson and Sumpter, 2001), and fish in receiving waters exhibit histological evidence of feminization, biased sex ratios, and developmental abnormalities (Loborsky and Cheek, 2001; Matthiessen, 2003; Bernaske and Koehler, 2008; Leet et al., 2011).

Exposure to EDCs can elicit severe and long-lasting impacts, primarily when fish are exposed early in development (Strussmann and Nakamura, 2002; Mills and Cechter, 2005). Several studies demonstrate that particular developmental stages are more vulnerable to EDCs than others. For example, Liney et al. (2005) exposed the common mackerel, *Rihtilla* rather, to a gradient of wastewater effluent and found little response in adults but 100% feminization in fish exposed during the embryonic through juvenile period, Atlantic
A GIS-based vulnerability assessment of brine contamination to aquatic resources from oil and gas development in eastern Sheridan County, Montana

Todd M. Preston, Tara L. Chesley-Preston, Joanna N. Thamke

Abbreviations: CI, Contamination Index; mg/l, milligram per liter; CI, Chloride (mg/l); specific conductance (μS/cm); DS, Dissolved Solids; GC, Gas Chromatography; GIS, Geographical Information System; NHD, National Hydrography Dataset; NWI, National Wetlands Inventory Dataset; PPI, Public Land Survey System; PPR, Prairie Pothole Region; STEPPE, Science Team about Energy in Prairie Pothole Environments; USGS, U.S. Geological Survey; WPP, Waterfowl Production Area.

1. Introduction

1.1 Background

Oil and gas production from the Williston Basin (Fig. 1) in the Northern Great Plains often produces large quantities of extremely saline co-produced water, or brine (used hereafter), with ratios of 10 barrels of brine to 1 barrel of oil not uncommon (Wanitka, 1997). Superimposed over much of the northern and eastern parts of the Williston Basin is
Figure 6. Meteoritics & Planetary Science

The Meteoritical Society might be excused for its misstatement of ownership; they are, after all, concerned about events on a higher plane. But this is still an inaccurate and misleading claim.

Particle aggregation in microgravity: Informal experiments on the International Space Station

Stanley G. LOVE, Donald R. PETTIT, and Scott R. MESSENGER

1NASA Lyndon B. Johnson Space Center, Mail Code CB, 2101 NASA Parkway, Houston, Texas 77058, USA
2Robert M. Walker Laboratory for Space Science, Astromaterials Research and Exploration Science Directorate, NASA Lyndon B. Johnson Space Center, Mail Code KR, 2101 NASA Parkway, Houston, Texas 77058, USA

Corresponding author. E-mail: stanley.g.love@nasa.gov

(Received 07 November 2013; revision accepted 22 February 2014)

Abstract—We conducted experiments in space to investigate the aggregation of millimeter- and submillimeter-sized particles in microgravity, an important early step in planet formation. Particulate materials included salt (NaCl), sugar (sucrose), coffee, mica, ice, Byurbolle chondrules, ordinary and carbonaceous chondrite meteorite fragments, and acrylic and glass beads, all triply confined in clear plastic containers. Angular submillimeter particles rapidly and spontaneously formed clusters strong enough to survive turbulence in a protoplanetary nebula. Smaller particles generally aggregated more strongly and quickly than larger ones. We observed only a weak dependence of aggregation time on particle number density. We observed no strong dependence on composition. Round, smooth particles aggregated weakly or not at all. In a mixture of particle types, some phases aggregated more readily than others, creating selection effects that controlled the composition of the growing clumps. The physical process of aggregation appears to be electrostatic in nature.

INTRODUCTION

A crucial step in planet formation is the growth of solid bodies in the millimeter to meter size range: too large to condense directly from the gas phase and too small to interact strongly through mutual gravitation. The widespread existence of planets demonstrates that some growth mechanism operated in that size regime, but the process is not well understood. Whatever it was, it worked despite nebular turbulence (e.g., Weidenschilling and Cuzzi 1993; Sekiya 1998; Cuzzi et al. 2001; Weidenschilling 2010) that was probably strong enough to disrupt small-scale gravitational collapse via the Goldreich and Ward (1973) mechanism and to break dust structures held together by weak surface forces. Work on this topic (reviewed by Beckwith et al. 2000; Cuzzi and Weidenschilling 2006; Dominik et al. 2007; Blum and Wurm 2008) has included the sticking properties of ice and frost (e.g., Supulver et al. 1995, 1997; Bridges et al. 1996), silicate dust in microgravity environments (e.g., Wurm and Blum 1998; Blum and Wurm 2000; Blum et al. 2000; Marshall and Cuzzi 2001; Wurm et al. 2001; Marshall et al. 2005; Güttler et al. 2010; Weidling et al. 2012; and references therein), and numerically modeled magnetic particles (e.g., Nuth and Wilkinson 1995; Dominik and Nümbold 2002; Wang et al. 2010).

Here, we present the results of particle aggregation experiments carried out in microgravity onboard the International Space Station (ISS). Despite their simplicity, these experiments illustrated the behavior of millimeter- and submillimeter-sized particles in low-density, low-viscosity gas (air) without the influence of gravity, conditions that are difficult to replicate on Earth for more than a few seconds. We found complex and often counterintuitive effects related to particle size, number density, composition, shape, and surface texture, as well as evidence that may help identify the physical mechanism that underlies the observed behavior. Because of the unsophisticated nature of the experiments it describes, this report is intended primarily to inform more formal and realistic future investigations of weightless particle aggregation.
APPLICATION OF HIGH-INTENSITY FOCUSED ULTRASOUND TO THE STUDY OF MILD TRAUMATIC BRAIN INJURY

JOSEPH T. MCCABE, CHANTAL MORATZ, YUNBO LIU, ELLEN BURTON, AMY MORGAN, CRAIG BUDINICH, DENNELL LOWE, JOHN ROSENBERGER, HUAZHEN CHEN, JIONG LIU, and MATTHEW MYERS

Department of Anatomy, Physiology and Genetics, Uniformed Services University of the Health Sciences (USUHS), Bethesda, Maryland, USA; Graduate Program in Neuroscience, USUHS, Bethesda, Maryland, USA; The Center for Neuroscience and Regenerative Medicine, USUHS, Bethesda, Maryland, USA; Department of Medicine, USUHS, Bethesda, Maryland, USA; and Center for Devices and Radiological Health, Food and Drug Administration, White Oak, Maryland, USA

(Received 19 June 2013; revised 13 November 2013; in final form 16 November 2013)

Abstract—Though intrinsically of much higher frequency than open-field blast overpressures, high-intensity focused ultrasound (HIFU) pulse trains can be frequency modulated to produce a radiation pressure having a similar form. In this study, 1.5-MHz HIFU pulse trains of 1-ns duration were applied to intact skulls of mice in vivo and resulted in blood-brain barrier disruption and immune responses (astrocyte reactivity and microglial activation). Analyses of variance indicated that 24 h after HIFU exposure, staining density for gli fibrillary acidic protein was elevated in the parietal and temporal regions of the cerebral cortex, corpus callosum and hippocampus, and staining density for the microglial marker, ionized calcium binding adaptor molecule, was elevated 2 and 24 h after exposure in the corpus callosum and hippocampus (all statistical test results, p < 0.05). HIFU shows promise for the study of some bio-effect aspects of blast-related, non-impact mild traumatic brain injuries in animals. (E-mail: Joseph.McCabe@usuhs.edu) Published by Elsevier Inc. on behalf of World Federation for Ultrasound in Medicine & Biology.

Key Words: Animal models, Blast injury, Blood–brain barrier, Mouse, High-intensity focused ultrasound, Traumatic brain injury.

INTRODUCTION

Civilian and military personnel exposure to violent explosions, often from improvised explosive devices (IEDs), has burgeoned with recent world events (Aschenasy-Steu er et al. 2005; Cernak et al. 1999; Dubose et al. 2011). In military populations, a RAND report (Tanielian and Jaycox 2008) estimated that as many as 20% (~320,000) of military personnel experienced some form of traumatic brain injury (TBI). In terms of severe TBI, a recent survey found that the majority are related to explosives (Wojcik et al. 2010), and severe blast-related traumatic brain injuries are a component of multiple injuries; a significant challenge to polytrauma care specialists (Aschenasy-Steu er et al. 2005; Dubose et al. 2011) and a hardship to the patient and family during rehabilitation and lifestyle adjustments (Bazarian et al. 2009; Sayer et al. 2008).

Milder forms of TBI are also a significant medical, social and economic challenge. Mild TBIs (mTBIs), in fact, constitute the majority of cases of blast-related exposures. Although nearly all individuals who sustain mTBIs eventually improve (Brown et al. 2011), residual cases persist and are likewise an ordeal for patient and caretakers and a challenge for neuropathology and imaging diagnosis, therapies, surgical reconstruction and home life adjustments (Silver et al. 2009; Tanielian and Jaycox 2008). In a sense, milder TBI has been enigmatic. The individual may have no other significant injuries, complaints may have a slower onset that is not evident as an acute manifestation and symptoms overlap and are comorbid with post-traumatic stress disorder (PTSD) diagnoses. Because of the lack of easily identifiable criteria for the critical factors related to pathophysiology, mild blast-related TBI is a significant challenge for pre-clinical researchers as well. Basic research...
Three-dimensional joint reaction forces and moments at the low back during over-ground walking in persons with unilateral lower-extremity amputation

Brad D. Hendershot, a,b,c Erik J. Wolf a,b,c

a Department of Rehabilitation, Walter Reed National Military Medical Center, Bethesda, MD 20889, USA
b Center for Rehabilitation Sciences Research, Department of Physical Medicine and Rehabilitation, Uniformed Services University of the Health Sciences, Bethesda, MD 20307, USA
c SFDD – VA Intramural Trauma and Amputation Center of Excellence, Walter Reed National Military Medical Center, Bethesda, MD 20889, USA

1. Introduction

Altered and asymmetric gait and movement are common among persons with lower-extremity amputation (LEA; Sagawa et al., 2011). Such changes in the mechanics of locomotion have been associated with the development of secondary physical conditions and pain (Galley et al., 2008). Low back pain (LBP), in particular, represents a frequent and debilitating impairment in this population that can often limit physical performance and reduce quality of life (Ende et al., 2001; Taghioff et al., 2009). Moreover, recent and projected incisions in the number of persons with LEA, resulting from traumatic injuries sustained during times of war (Reiber et al., 2010) and complications of vascular disease (Ziegler-Graham et al., 2008), further highlight the importance of understanding the underlying mechanisms linking LEA and LBP; yet, such mechanisms are still unclear. Though most LBP remains idiopathic, physical (biomechanical) risk factors appear to play a more important role in this population.

Increased spinal loads have been identified as an important proximate cause of LBP (Kumar, 2001; McGill, 2007). Mechanical loads among tissues in surrounding the spine are influenced by forces arising from gravity, inertia, and externally applied loads, as well as internal forces produced by ligaments and muscle contractions. Of particular interest here, the trunk (+ head and arms) accounts for nearly two thirds of total body mass (Winter, 1990), and as such even small displacements of the trunk center of mass can substantially alter muscular demands and joint reaction loads throughout the body (Gillet et al., 2004). For persons with unilateral LEA, increased and asymmetric trunk movements during locomotion have been observed (Capruzzo et al., 1982; Goujon-Fillet et al., 2008; Jaegers et al., 1995; Michael et al., 2000; Tura et al., 2010), and which have been suggested to result from a neuromuscular/movement strategy that uses trunk weight/ inertia to assist with forward progression and/or stabilizing the body. 

[Figure 8. Clinical Biomechanics]

And finally, the publisher claims to own not only the research product of two U.S. Army doctors concerning the treatment and rehabilitation of amputees, even though they are clearly U.S. government employees, but additionally and separately, the abstract or summary of that research. I am reminded of one of my favorite characters from literature: “I’m Yertle the Turtle! Oh, marvelous me! For I am the ruler of all that I see!” I wonder what re-use rights they will allow us here in their “license_ref” attribute field, and how seriously we should treat their assertions.