Survey of injuries among West End performers

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Abstract

Objectives—To obtain more information about injuries of West End performers.
Methods—A retrospective survey of 269 performers appearing in 20 West End productions (12 dramas and eight musicals).
Results—In current productions, 46% of all performers sustained at least one injury for an average of 0.87 injuries per performer. Lower extremity injuries were the most common for dancers (52.2%) and actors (43.2%) with neck and back injuries the second most common. Sprains and strains were the most common diagnoses. 61% of performers thought that their injuries were preventable. Most performers consulted non-physician healthcare providers. Factors significantly influencing the risk of injuries for performers include female sex, a history of previous injuries, missed performances due to previous injuries, more physically demanding roles, and performing on raked (angled) stages.
Conclusion—West End performers commonly sustain injuries. Although primary prevention of most theatrical injuries is not possible, modification of raked stages may reduce the incidence. This study may be helpful to the growing number of healthcare providers who practice performing arts medicine and may stimulate additional concern and research in the medical and theatrical communities about the performance injuries of professionals, amateurs, and theatrical students worldwide.

Keywords: injuries; dancers; actors

For the audience, West End productions can offer insightful and witty dialogue, inspiring and enthralling music, and seemingly effortless, dazzling dancing by some of the world’s outstanding performers. Behind the glamour and glitz, however, is a highly stressful workplace where the performers can sustain a variety of occupational injuries. After our recent study on the prevalence and risk factors for theatrical injuries in 23 Broadway companies, we performed a similar survey of West End companies.

Methods

SAMPLING

The study was performed with the cooperation of the staff and members of the British Actors' Equity Association who selected 20 West End theatrical productions in London chosen for a mixture of dramas and musicals for the survey (table 1). The productions are 12 dramas and eight musicals. The deputy of each company distributed the survey to all cast members on various dates in February 1996. An attached letter from the Association introduced and endorsed the survey. The respondent could either mail in their anonymously completed questionnaire to the Association or give it to the deputy to send in. The number of respondents was 269 out of 379 total cast members (71%).

SOURCES OF ERROR AND BIAS

Retrospective surveys of injury, including this one, present potential problems with the accuracy of the respondents’ recollections. As their occupations are at risk, professional performers may be especially likely to remember their injuries. Additionally, the assurance of anonymity may also have encouraged candor in the responses. The injury rate may be slightly higher than described as disabled performers were not included in the survey. About five to 10 performers a year in all West End productions are disabled from injuries and not able to complete their contracts.

The overall response rate of 71%, with the response rates of the cast members in various productions ranging from 44.4% to 100%, is another potential source of bias. However, the degree to which the productions had a response rate above or below the mean for the sample was not significantly related to the number of injuries sustained in their current production ($F_{1.19}=0.43, p=0.52$) or to whether they sustained an injury in their current production ($F_{1.19}=0.25, p=0.63$). Likewise, having a 100% response rate versus a less than perfect response rate was unrelated to the number of injuries ($F_{1.19}=1.9, p=0.19$) or whether the performer sustained an injury ($F_{1.19}=0.11, p=0.75$). These findings suggest that the non-respondents may be similar to the respondents.

STATISTICAL ANALYSIS AND VARIABLE SELECTION

The survey questionnaire (appendix) consisted of self reported items designed to provide information about theatrical injuries and possible risk factors. The questionnaire was based on our Broadway survey with input from an official of the British Actors’ Equity Association (Hilary Strange, Senior West End Theatre Organiser). In the covering letter from the British Actors’ Equity Association, injury was defined as follows: “Injury constitutes any theatre-related injury resulting in physical damage to the person. Please report any injuries you have sustained even those not resulting in missed performances.”

For the initial risk factor analysis, unconditional logistic regression was used to generate
odds ratios (ORs) for predictor variables, adjusted for the following covariates: number of weeks with the current production; number of performances with the current production; and number of minutes on stage each performance. Continuous predictors (height, age, etc.), were categorised by quartiles of their distributions. The outcome for all analyses was whether the respondent indicated that they had been injured over the course of their current production.

As recommended when developing multivariable logistic regression models through stepwise procedures, all variables that predicted injury with even moderate probability of significance (p<0.25) were further tested with a criterion for inclusion in the final model being more restrictive (p<0.15). These selected models were further expanded by the forced inclusion of the three covariates implemented in the earlier risk factor analysis.

### Results

**CHARACTERISTICS OF THE STUDY POPULATION**

Tables 1 and 2 present the demographic characteristics of the performers. The performers sustained 2.4 injuries per 1000 performances and 2.1 injuries per 1000 hours performing on stage during their current production. For dancers and actors, respectively, 18.5% and 43.1% of injuries resulted in at least one missed performance. For the three most recent injuries, 60.8% of all performers thought that their injuries were preventable.

**RISK FACTORS FOR INJURY**

The initial risk factor analysis identified various risk factors that significantly influence the risk of injury for performers (table 3): the performers’ sex; age; age when they began instruction; duration as professional; previously injured; previously missed performing due to injury; physical demands of the role; and amount of choreography in the show.

As actors and dancers may have different patterns of risk factors, a series of pairwise interactions with the type of performer and each predictor were modelled after the initial models (table 3). Of these moderating effects tested, the following were significant (p<0.05): sex, age, height, body mass, duration as professional, previously injured, previously missed performing due to injury; currently smoker, and performed on a raked (angled) stage. Male sex (OR (95% confidence interval (95% CI)) 0.5 (0.3 to 0.9) and 0.5 (0.1 to 2.6) in actors and dancers, respectively), older age (OR (95% CI) 0.3 (0.1 to 0.6) and 1.8 (0.4 to 7.8) in

### Table 1: Productions surveyed and demographics of West End performers

<table>
<thead>
<tr>
<th>Production</th>
<th>Questionnaires returned (%)</th>
<th>Respondents (n)</th>
<th>Mean weeks in production</th>
<th>Mean physical demands*</th>
<th>Mean injuries / performer</th>
<th>Injured during production (%)</th>
<th>Size of rake† (%) size of rake**</th>
<th>Choreography in show</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oliver</td>
<td>78</td>
<td>29</td>
<td>22.4</td>
<td>2.69</td>
<td>0.83</td>
<td>57</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>Mousetrap</td>
<td>54</td>
<td>07</td>
<td>24.1</td>
<td>2.00</td>
<td>0.14</td>
<td>14</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Buddy</td>
<td>67</td>
<td>16</td>
<td>76.6</td>
<td>3.19</td>
<td>0.94</td>
<td>44</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Fame</td>
<td>63</td>
<td>20</td>
<td>27.7</td>
<td>2.80</td>
<td>0.65</td>
<td>35</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Blood brothers</td>
<td>86</td>
<td>12</td>
<td>91.9</td>
<td>3.27</td>
<td>1.33</td>
<td>83</td>
<td>8</td>
<td>2</td>
</tr>
<tr>
<td>Les miserables</td>
<td>69</td>
<td>22</td>
<td>75.6</td>
<td>3.50</td>
<td>1.80</td>
<td>77</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Only the lonely</td>
<td>53</td>
<td>08</td>
<td>37.4</td>
<td>2.63</td>
<td>0.13</td>
<td>15</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Phantom of the opera</td>
<td>67</td>
<td>24</td>
<td>83.9</td>
<td>2.63</td>
<td>0.75</td>
<td>50</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Communicating doors</td>
<td>80</td>
<td>08</td>
<td>24.6</td>
<td>3.38</td>
<td>0.63</td>
<td>38</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Dead funny</td>
<td>44</td>
<td>04</td>
<td>14.0</td>
<td>2.25</td>
<td>0.00</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>The hot house</td>
<td>70</td>
<td>07</td>
<td>10.3</td>
<td>1.67</td>
<td>0.00</td>
<td>0</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Jolson</td>
<td>53</td>
<td>16</td>
<td>15.0</td>
<td>2.38</td>
<td>0.75</td>
<td>50</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>Indian ink</td>
<td>67</td>
<td>12</td>
<td>34.4</td>
<td>1.67</td>
<td>0.00</td>
<td>0</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>An inspector calls</td>
<td>71</td>
<td>05</td>
<td>23.6</td>
<td>3.40</td>
<td>0.00</td>
<td>0</td>
<td>10</td>
<td>0</td>
</tr>
<tr>
<td>The master builder</td>
<td>55</td>
<td>06</td>
<td>17.0</td>
<td>1.67</td>
<td>0.00</td>
<td>0</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Mack and mabel</td>
<td>100</td>
<td>27</td>
<td>11.2</td>
<td>3.07</td>
<td>0.56</td>
<td>44</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>Starlight express</td>
<td>100</td>
<td>21</td>
<td>153.4</td>
<td>4.40</td>
<td>2.95</td>
<td>81</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>The wind in the willows</td>
<td>70</td>
<td>14</td>
<td>7.4</td>
<td>3.43</td>
<td>0.57</td>
<td>57</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>The women in black</td>
<td>100</td>
<td>05</td>
<td>174.5</td>
<td>2.20</td>
<td>0.00</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Tommy Steele</td>
<td>63</td>
<td>05</td>
<td>33.6</td>
<td>3.80</td>
<td>0.80</td>
<td>80</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>71.0</td>
<td>269</td>
<td>49.4</td>
<td>2.93</td>
<td>0.87</td>
<td>46</td>
<td>3</td>
<td>1.4</td>
</tr>
</tbody>
</table>

*Mean physical demands is a self rating that ranged from 1 (least) to 5 (most).
†These data were provided by the British Actors’ Equity Association. Choreography in show ranged from 0 (none) to 3 (heavy).
Physical demands ranged from 1 (least) to 5 (most). Amount of choreography ranged from 0 to 2. Table 4 presents the unconditional logistic regression multivariate model derived from the stepwise regression procedures used. This final model includes 11 predictors and three additional covariates (Δ2 log likelihood = 274.6; \( \chi^2 \) (df=14)=102.0, p<0.0001). The overall correct classification as injured or not injured was 74.0% (75.2% of those who reported not being injured and 72.6% of those who reported having one or more injuries).

Performers with high physical demands of the role had an additional 4.5 injuries per 10,000 performances, accounting for 61.5% of the injuries to this group and 18.8% of the injuries to all performers surveyed. An additional 4.3 injuries per 10,000 performances can be attributed to performing on raked stages, representing 37.5% of the injuries to those performers who perform on a raked stage and 18.0% of the injuries to all performers surveyed.

**INJURIES**

Table 5 lists the number and sites of injuries from the current and previous productions for the dancers and actors. Previous productions include all earlier professional and amateur productions. In current productions, lower extremity injuries (mostly of the knee and ankle) were the most common for dancers (52.2%) and actors (43.2%) with neck and back injuries the second most common type for all performers. There were many other sites of injuries including the larynx or vocal cord strain as detailed. The relative percentages of sites of injury from earlier productions were similar to those from current productions.

**HEALTHCARE PROVIDERS AND DIAGNOSES**

Table 6 provides the types of healthcare professionals seen and diagnoses given for the injuries as reported by the performers. Medical attention was sought for 92% of the injuries to dancers and 73% of the injuries to actors. Most dancers and actors saw non-physicians, most commonly physiotherapists, masseurs, chiropractors, and acupuncturists. Ear, nose, and throat physicians were seen by 4.9% of actors for voice or larynx injuries. Sprains and strains were the most common diagnoses for the injuries of all performers.

**Discussion**

This is the first epidemiological survey of injuries to West End performers. Forty-six percent of all performers sustained at least one injury or an average of 0.87 injuries per performer for the current productions. The frequency, site, and type of injuries of actors and dancers are similar to those of Broadway performers. The injuries of dancers are also consistent with earlier studies of professional ballet dancers in the United States’ and professional dancers of classical ballet and modern dance in the United Kingdom. As in the Broadway survey, 60.8% of all West End performers thought that their injuries were preventable. Most Broadway and West End performers saw non-physicians for their injuries. Although there is widespread use of non-physician providers

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**Table 3** Analysis of risk factors for injury in the current production (n=269)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Adjusted OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Demographic variables:</td>
<td></td>
</tr>
<tr>
<td>Dancer</td>
<td>2.4* (1.3 to 4.5)</td>
</tr>
<tr>
<td>Male</td>
<td>0.5* (0.3 to 0.9)</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>Older</td>
<td>0.4* (0.2 to 0.8)</td>
</tr>
<tr>
<td>Younger</td>
<td>1.9* (1.1 to 3.3)</td>
</tr>
<tr>
<td>Height: Tall</td>
<td>1.0 (0.6 to 1.6)</td>
</tr>
<tr>
<td>Shorter</td>
<td>1.1 (0.6 to 1.8)</td>
</tr>
<tr>
<td>Weight: Greater</td>
<td>0.8 (0.5 to 1.4)</td>
</tr>
<tr>
<td>Lesser</td>
<td>1.4 (0.8 to 2.6)</td>
</tr>
<tr>
<td>Body mass: Greater</td>
<td>0.8 (0.5 to 1.5)</td>
</tr>
<tr>
<td>Lesser</td>
<td>1.1 (0.7 to 1.9)</td>
</tr>
<tr>
<td>Career variables:</td>
<td></td>
</tr>
<tr>
<td>Age began instruction:</td>
<td></td>
</tr>
<tr>
<td>Later</td>
<td>1.0 (0.5 to 1.7)</td>
</tr>
<tr>
<td>Earlier</td>
<td>2.3* (1.3 to 4.0)</td>
</tr>
<tr>
<td>Duration as professional:</td>
<td></td>
</tr>
<tr>
<td>Longer</td>
<td>0.5* (0.3 to 0.9)</td>
</tr>
<tr>
<td>Shorter</td>
<td>1.6 (0.9 to 2.9)</td>
</tr>
<tr>
<td>Previously injured</td>
<td>5.0* (2.7 to 9.1)</td>
</tr>
<tr>
<td>Previsouly missed performing due to injury</td>
<td>2.1* (1.3 to 3.6)</td>
</tr>
<tr>
<td>Training or preparation variables:</td>
<td></td>
</tr>
<tr>
<td>Currently exercising</td>
<td>1.6 (1.0 to 2.6)</td>
</tr>
<tr>
<td>Currently in dance or acting classes</td>
<td>1.3 (0.7 to 2.3)</td>
</tr>
<tr>
<td>Warms up before performing</td>
<td>1.9* (1.1 to 3.1)</td>
</tr>
<tr>
<td>Currently smokes</td>
<td>1.1 (0.6 to 1.9)</td>
</tr>
<tr>
<td>Production feature variables:</td>
<td></td>
</tr>
<tr>
<td>Physical demands of their role:</td>
<td></td>
</tr>
<tr>
<td>≥3</td>
<td>3.1* (1.7 to 5.6)</td>
</tr>
<tr>
<td>≤2</td>
<td>0.2* (0.1 to 0.5)</td>
</tr>
<tr>
<td>Amount of choreography in show:</td>
<td></td>
</tr>
<tr>
<td>≥3</td>
<td>2.1* (1.2 to 3.5)</td>
</tr>
<tr>
<td>≤1</td>
<td>0.2* (0.1 to 0.4)</td>
</tr>
<tr>
<td>Performed on a raked stage</td>
<td>1.6 (1.0 to 2.7)</td>
</tr>
</tbody>
</table>

Results were calculated with single predictor logistic models with control for the number of performances with that production, weeks with that production, minutes on stage per show, and all other variables presented in this table.

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**Table 4** Multivariate analysis of risk factors for injury in the current production (n=269)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Adjusted OR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>0.5* (0.2 to 1.0)</td>
</tr>
<tr>
<td>Older age</td>
<td>0.5 (0.2 to 1.0)</td>
</tr>
<tr>
<td>Began instruction earlier</td>
<td>2.0 (1.0 to 3.2)</td>
</tr>
<tr>
<td>Shorter duration as professional</td>
<td>1.8 (0.9 to 3.7)</td>
</tr>
<tr>
<td>Previously injured</td>
<td>4.9* (2.4 to 10.0)</td>
</tr>
<tr>
<td>Warms up before performing</td>
<td>1.7 (0.9 to 3.1)</td>
</tr>
<tr>
<td>Most (≥3) physically demanding role</td>
<td>2.6* (1.3 to 5.4)</td>
</tr>
<tr>
<td>Least (&lt;2) physically demanding role</td>
<td>0.3* (0.1 to 0.9)</td>
</tr>
<tr>
<td>Highest (≥2) amount of choreography in show</td>
<td>0.4 (0.2 to 1.0)</td>
</tr>
<tr>
<td>Least (&lt;1) amount of choreography in show</td>
<td>0.3 (0.1 to 0.7)</td>
</tr>
<tr>
<td>Performed on a raked stage</td>
<td>1.6 (0.9 to 3.0)</td>
</tr>
</tbody>
</table>

Results from the final unconditional logistic regression model with covariates that included number of performances with that production, weeks with that production, minutes on stage each show, and all other variables presented in this table.

*p<0.05 Wald statistics.
among the general population in the United States, this is not the case in the United Kingdom. Performers may wish to obtain rapidly available physical treatments.

Several variables influence the likelihood of injury for performers. In both the West End and Broadway, performers with the highest level of physical demands are at increased risk of injury by a factor of about 3. In this survey, dancers in productions with greater amounts of choreography were 2.1 times more likely to sustain injuries. A history of previous injuries and previously missed performances due to injury also significantly increased the risk of injuries for actors in the current production. As in the Broadway survey, women performers are more likely to sustain injuries than men.

Although the explanation is not known, wearing high heeled shoes may contribute. A raked stage is a stage that is angled down toward the audience to improve the view. The percentage of the slope in the productions surveyed ranged from 3% to 10%. Raked stages can lead to increased injuries because of the performers’ accommodating shift backwards in their centre of gravity. In the current study, performing on a raked stage was a significant risk factor for injury in actors only whereas on Broadway, performing on a raked stage was a significant risk factor for dancers but not actors. These findings may be explained by the presence of more actors and fewer dancers in the current study compared with the Broadway survey leading to differences in the power to detect significant relations.

This investigation may be useful for the growing number of physicians and other health professionals who are involved in performing arts medicine. Primary prevention is another application as one of the significant risk factors, raked stages, can be modified. With the findings from our Broadway survey, the 1996 production contract of the Actors’ Equity Association of the United States has recommended a maximum slope of no more than 7.5% and instituted a physiotherapy programme (Kenneth Greenwood of Actors’ Equity Association, personal communication). Also, this West End survey was influential in the West End production contract to be completed on 12 January 1998 (Hilary Strange of the British Actors’ Equity Association, personal communication). In a new clause, if a performer is required to work on a steeply raked stage, the employer will provide a “rake specialist” (usually a physiotherapist) to show performers how to work safely on a raked surface with an exercise programme and will provide continuous supervision and support. This study may also be helpful for the planning of

Table 5 Sites of reported injuries

<table>
<thead>
<tr>
<th></th>
<th>Dancers (n=58)</th>
<th>Actors (n=211)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>During this production:*</td>
<td>65 (17.4)</td>
<td>132 (16.2)</td>
</tr>
<tr>
<td>Lower extremity injuries:</td>
<td>34 (52.3)</td>
<td>57 (43.2)</td>
</tr>
<tr>
<td>Hip</td>
<td>0 (0.0)</td>
<td>1 (0.8)</td>
</tr>
<tr>
<td>Groin</td>
<td>3 (4.6)</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>Thigh</td>
<td>3 (4.6)</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>Knee</td>
<td>11 (16.9)</td>
<td>26 (19.7)</td>
</tr>
<tr>
<td>Shin</td>
<td>1 (1.5)</td>
<td>5 (3.8)</td>
</tr>
<tr>
<td>Calf</td>
<td>0 (1.5)</td>
<td>1 (0.8)</td>
</tr>
<tr>
<td>Ankle</td>
<td>12 (18.5)</td>
<td>10 (7.6)</td>
</tr>
<tr>
<td>Foot or toe</td>
<td>3 (4.6)</td>
<td>8 (6.1)</td>
</tr>
<tr>
<td>Neck and back injuries:</td>
<td>22 (33.9)</td>
<td>28 (21.2)</td>
</tr>
<tr>
<td>Neck</td>
<td>7 (10.8)</td>
<td>4 (3.0)</td>
</tr>
<tr>
<td>Lower back</td>
<td>12 (18.5)</td>
<td>19 (11.4)</td>
</tr>
<tr>
<td>Mid (upper) back</td>
<td>3 (4.6)</td>
<td>9 (6.8)</td>
</tr>
<tr>
<td>Other injuries:</td>
<td>9 (13.9)</td>
<td>50 (37.9)</td>
</tr>
<tr>
<td>Head</td>
<td>(1.5)</td>
<td>3 (2.3)</td>
</tr>
<tr>
<td>Larynx (vocal cords)</td>
<td>1 (1.5)</td>
<td>15 (11.4)</td>
</tr>
<tr>
<td>Shoulder</td>
<td>2 (3.1)</td>
<td>5 (3.8)</td>
</tr>
<tr>
<td>Arm</td>
<td>1 (1.5)</td>
<td>5 (3.8)</td>
</tr>
<tr>
<td>Hand or finger</td>
<td>2 (3.1)</td>
<td>8 (6.1)</td>
</tr>
<tr>
<td>Rib cage</td>
<td>0 (0.0)</td>
<td>5 (3.8)</td>
</tr>
<tr>
<td>Multiple (sites)</td>
<td>(1.5)</td>
<td>5 (3.8)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (1.5)</td>
<td>4 (3.0)</td>
</tr>
<tr>
<td>Before production:*</td>
<td>367 (82.6)</td>
<td>681 (83.8)</td>
</tr>
<tr>
<td>Total number of injuries for current and past productions</td>
<td>432</td>
<td>813</td>
</tr>
</tbody>
</table>

*These aggregated results were based on the entire history of injuries.

Table 6 Healthcare providers seen and reported healthcare provider diagnosis for injuries during the current production

<table>
<thead>
<tr>
<th>Healthcare providers seen:</th>
<th>Responses indicating injuries to dancers n (%)</th>
<th>Responses indicating injuries to actors n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physiotherapist</td>
<td>48 (56.5)</td>
<td>52 (31.7)</td>
</tr>
<tr>
<td>Masseur</td>
<td>8 (9.4)</td>
<td>General practitioner 28 (17.1)</td>
</tr>
<tr>
<td>General practitioner</td>
<td>6 (7.1)</td>
<td>Ear, nose, and throat 8 (4.9)</td>
</tr>
<tr>
<td>Osteopath</td>
<td>4 (4.7)</td>
<td>Masseur 7 (4.3)</td>
</tr>
<tr>
<td>Chiropractor</td>
<td>4 (4.7)</td>
<td>Orthoepedist 5 (3.1)</td>
</tr>
<tr>
<td>Acupuncturist</td>
<td>3 (3.5)</td>
<td>Osteopath 5 (3.1)</td>
</tr>
<tr>
<td>Podiatrist</td>
<td>2 (2.4)</td>
<td>Chiropractor 4 (2.4)</td>
</tr>
<tr>
<td>Ear, nose, and throat</td>
<td>1 (1.2)</td>
<td>Acupuncturist 2 (1.2)</td>
</tr>
<tr>
<td>Other</td>
<td>2 (2.4)</td>
<td>Podiatrist 2 (1.2)</td>
</tr>
<tr>
<td>None seen</td>
<td>7 (8.2)</td>
<td>Other 6 (3.7)</td>
</tr>
<tr>
<td>Total</td>
<td>85 (100.0)</td>
<td>Total 45 (27.4)</td>
</tr>
<tr>
<td>Reported healthcare provider diagnosis:</td>
<td></td>
<td>164 (100.0)</td>
</tr>
<tr>
<td>Sprain or strain</td>
<td>19 (38.8)</td>
<td>Sprain or strain 41 (51.9)</td>
</tr>
<tr>
<td>Pinched nerve</td>
<td>6 (12.2)</td>
<td>Inflammation 10 (12.7)</td>
</tr>
<tr>
<td>Dislocation</td>
<td>4 (8.3)</td>
<td>Pinched nerve 5 (6.3)</td>
</tr>
<tr>
<td>Inflammation (chronic)</td>
<td>3 (6.1)</td>
<td>Stress fracture 4 (5.1)</td>
</tr>
<tr>
<td>Snap or tear</td>
<td>2 (4.1)</td>
<td>Contusion 3 (3.8)</td>
</tr>
<tr>
<td>Contusion</td>
<td>1 (2.0)</td>
<td>Acute fracture 2 (2.5)</td>
</tr>
<tr>
<td>Other</td>
<td>14 (28.6)</td>
<td>Dislocation 2 (2.5)</td>
</tr>
<tr>
<td>No diagnosis</td>
<td>1 (2.0)</td>
<td>Snap or tear 1 (1.2)</td>
</tr>
<tr>
<td>Total</td>
<td>49 (100.0)</td>
<td>Puncture or cut 1 (1.2)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Other 8 (10.1)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No diagnosis 2 (2.5)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Total 79 (100.0)</td>
</tr>
</tbody>
</table>
healthcare provider needs by theatrical unions and production companies as well as for the evaluation and prevention of injuries to theatrical students and non-professionals worldwide.

We greatly appreciate the assistance and cooperation of the members and staff (Hilary Strange, Senior West End Theatre Organiser and Peter Finch, Assistant General Secretary) of the British Actors' Equity Association.

**PART 1: YOUR BACKGROUND**

1. What type of performer are you in your current production? If you have dancing and acting roles, please mark the one that describes your major activity.
   - Dancer
   - Actor (including singing)
2. What is your date of birth and current age? (Month, Day, Year) Current Age
3. What is your gender? (Male/Female)
4. What is your height and weight? Height __________ Weight __________
5. At what age did you begin dancing, acting, or other performance related instruction, and for how long have you been a professional performer?

**PART 2: ACTIVITIES & TRAINING**

7. Are you a regular cigarette smoker?
   - Yes
   - No
8a. Are you involved in an exercise or weight training regimen (activities)?
   - Yes
   - No (Skip to question 10)
b. How often do you participate in the following activities as part of your exercise regimen? PLEASE MARK FOR ALL ACTIVITIES.
   - Once per week
   - 1-3 times per week
   - 4 or more times per week
   - None
   - Less than once per week

- Weight training
- Running
- Swimming
- Football
- Tennis/Squash
- Cricket
- Rowing
- Cycling
- Aerobics
- Yoga
- Other (please specify)
9a. Do you warm-up before a performance?
   - Yes
   - No
b. What type of warm-up do you do?
   - Stretch
   - Barre / Bar
   - Other (please specify)

**PART 3: INFORMATION ABOUT YOUR CURRENT PRODUCTION**

10. In what production are you currently performing?
   - Cats
   - Oliver
   - Mousetrap
   - Miss Saigon
   - Grease
   - Crazy for You

11. Over the whole show an average, how would you rate the physical demands of your role?
   - Least Demanding
   - Most Demanding
   - (1) (2) (3) (4) (5)

12. How long have you been involved in this production? Please report both total weeks and total number of performances.

   - Weeks
   - Performances

14a. How many dance numbers are you in? Please mark "0" if you were in none.
   - (Number of dance numbers)

**PART 4: INJURIES SUSTAINED IN YOUR CURRENT PRODUCTION**

17. How many injuries have you sustained over the course of this production and how many performances have they caused you to miss?
   - None
   - One injury
   - Two injuries
   - Three injuries
   - Four injuries
   - Five injuries
   - Six or more

For each of the 3 most recent injuries in your current production, please provide the following information. If you have more than 3 injuries, Injury One is your most recent injury, while Injury Two refers to the second most recent injury in your current production.

******Injury One Information (most recent injury or your only injury in this production)******

18a. Location of Injury One?
   - Head
   - Vocal chords
   - Neck
   - Shoulder
   - Arm
   - Wrist
   - Elbow
   - Hand
   - Finger(s)
   - Upper/lower back
   - Other

b. At what point in your current production did the injury occur, and about how many total performances did you miss due to this injury?

   - Weeks in the production
   - Missed performances
   - When the injury occurred
### Survey of West End Performers

#### Questionnaire:

1. **If you had surgery because of this injury, what type of surgery was it?**
   - [ ] No surgery was performed
   - [ ] Shoulder surgery
   - [ ] Neck surgery
   - [ ] Other

2. **Was the injury work-related?**
   - [ ] Yes
   - [ ] No

3. **Where and how long were you treated for this injury?**
   - [ ] In a hospital emergency room
   - [ ] In a hospital outpatient clinic
   - [ ] In a doctor's office
   - [ ] In a physical therapy clinic
   - [ ] Other:

4. **If you consulted with a doctor or other health care professional, who was your primary diagnosis?**
   - [ ] No provider was seen
   - [ ] Other:

5. **What specific tests were used to diagnose this injury?**
   - [ ] P Namen conflict
   - [ ] Other:

6. **What specific tests were used to diagnose the injury?**
   - [ ] P Namen conflict
   - [ ] Other:

7. **How long did you experience any symptoms from this injury?**
   - [ ] Less than one week
   - [ ] One week to three months
   - [ ] Three months to one year
   - [ ] One year or more

8. **How long did you experience any symptoms from this injury?**
   - [ ] Less than one week
   - [ ] One week to three months
   - [ ] Three months to one year
   - [ ] One year or more

9. **How long did you experience any symptoms from this injury?**
   - [ ] Less than one week
   - [ ] One week to three months
   - [ ] Three months to one year
   - [ ] One year or more

10. **How long did you experience any symptoms from this injury?**
    - [ ] Less than one week
    - [ ] One week to three months
    - [ ] Three months to one year
    - [ ] One year or more
**SURVEY OF WEST END PERFORMERS**

1. Are you pursuing a claim for compensation for this injury through Equity?
   - [ ] Yes  [ ] No

m. If this injury could have been prevented, which of the following may have contributed to the occurrence of this injury? PLEASE MARK ALL THAT APPLY.
   - [ ] Poor Shoes
   - [ ] Prevalence of fog/atmosphere
   - [ ] Other: (please specify)____________________

d. In what capacity did you perform while experiencing significant pain due to this injury? Please mark "0" if you did not perform in pain.
   - [ ] No performance

e. Do you currently have any symptoms from this injury?
   - [ ] Yes  [ ] No

f. How long did you experience any symptoms due to this injury?
   - [ ] Less than 1 week
   - [ ] 1-2 weeks
   - [ ] 3-4 weeks
   - [ ] 5-6 weeks
   - [ ] 7-8 weeks
   - [ ] More than 8 weeks

2. Please specify the type of injury you have sustained.
   - [ ] Head
   - [ ] Neck
   - [ ] Arm
   - [ ] Shoulder
   - [ ] Finger(s)
   - [ ] Upper/mid back
   - [ ] Other: (please specify)____________________

2a. Location of Injury Three:
   - [ ] Head
   - [ ] Neck
   - [ ] Arm
   - [ ] Finger(s)
   - [ ] Upper/mid back
   - [ ] Other: (please specify)____________________

2b. If you consulted with a doctor or other healthcare provider, what was the primary diagnosis of this injury?
   - [ ] No provider was seen
   - [ ] No diagnosis was made
   - [ ] Stress fracture
   - [ ] Acute fracture
   - [ ] Other: (please specify)____________________

2c. What specific tests were used to diagnose the injury? PLEASE MARK ALL THE TESTS THAT WERE USED.
   - [ ] X-ray
   - [ ] CAT scan
   - [ ] MR scan
   - [ ] Other:____________________

2d. What were the results of the above tests?
   - [ ] Normal
   - [ ] Abnormal
   - [ ] Other: (please specify)____________________

2e. What was your overall treatment plan for this injury?
   - [ ] Yes
   - [ ] No

2f. How many weeks since the injury?
   - [ ] Less than 1 week
   - [ ] 1-2 weeks
   - [ ] 3-4 weeks
   - [ ] 5-6 weeks
   - [ ] 7-8 weeks
   - [ ] More than 8 weeks

2g. How many times in total have you been injured in the following location(s)? Please mark "0" if you have not sustained any injuries to your body in these locations.
   - [ ] Lower leg
   - [ ] Lower back
   - [ ] Other: (please specify)____________________

PART 2: RELATED EXPERIENCES AND THOUGHTS ABOUT INJURIES

21. The following items pertain to all performing-related injuries you may have sustained BEFORE YOUR CURRENT PRODUCTION.

21a. Of the total injuries you have sustained, about how many resulted in you missing at least one performance, and how many in surgery?
   - [ ] Missed performance
   - [ ] Missed surgery

21b. Indicate how many weeks in total you have missed due to injury in the following locations? Please mark "0" if you have not missed any performances due to injury in these locations.
   - [ ] Lower leg
   - [ ] Lower back
   - [ ] Other: (please specify)____________________

21c. How frequently do you observe the following features in your current production?
   - [ ] Rarely
   - [ ] Occasionally
   - [ ] Frequently

21d. How often have you performed with a specific injury in the following categories?
   - [ ] Head
   - [ ] Neck
   - [ ] Arm
   - [ ] Finger(s)
   - [ ] Upper/mid back
   - [ ] Other: (please specify)____________________

21e. What was your overall treatment plan for this injury?
   - [ ] Yes
   - [ ] No

21f. What were the results of the above tests?
   - [ ] Normal
   - [ ] Abnormal
   - [ ] Other: (please specify)____________________

21g. What was your overall treatment plan for this injury?
   - [ ] Yes
   - [ ] No

21h. How many weeks since the injury?
   - [ ] Less than 1 week
   - [ ] 1-2 weeks
   - [ ] 3-4 weeks
   - [ ] 5-6 weeks
   - [ ] 7-8 weeks
   - [ ] More than 8 weeks

21i. How many times in total have you been injured in the following location(s)? Please mark "0" if you have not sustained any injuries to your body in these locations.
   - [ ] Lower leg
   - [ ] Lower back
   - [ ] Other: (please specify)____________________

21j. How many times have you performed with a specific injury in the following categories?
   - [ ] Head
   - [ ] Neck
   - [ ] Arm
   - [ ] Finger(s)
   - [ ] Upper/mid back
   - [ ] Other: (please specify)____________________

21k. What was your overall treatment plan for this injury?
   - [ ] Yes
   - [ ] No

21l. How many weeks since the injury?
   - [ ] Less than 1 week
   - [ ] 1-2 weeks
   - [ ] 3-4 weeks
   - [ ] 5-6 weeks
   - [ ] 7-8 weeks
   - [ ] More than 8 weeks

21m. How many times in total have you been injured in the following location(s)? Please mark "0" if you have not sustained any injuries to your body in these locations.
   - [ ] Lower leg
   - [ ] Lower back
   - [ ] Other: (please specify)____________________

21n. How many times have you performed with a specific injury in the following categories?
   - [ ] Head
   - [ ] Neck
   - [ ] Arm
   - [ ] Finger(s)
   - [ ] Upper/mid back
   - [ ] Other: (please specify)____________________

21o. What was your overall treatment plan for this injury?
   - [ ] Yes
   - [ ] No

21p. How many weeks since the injury?
   - [ ] Less than 1 week
   - [ ] 1-2 weeks
   - [ ] 3-4 weeks
   - [ ] 5-6 weeks
   - [ ] 7-8 weeks
   - [ ] More than 8 weeks

21q. How many times in total have you been injured in the following location(s)? Please mark "0" if you have not sustained any injuries to your body in these locations.
   - [ ] Lower leg
   - [ ] Lower back
   - [ ] Other: (please specify)____________________

21r. How many times have you performed with a specific injury in the following categories?
   - [ ] Head
   - [ ] Neck
   - [ ] Arm
   - [ ] Finger(s)
   - [ ] Upper/mid back
   - [ ] Other: (please specify)____________________

21s. What was your overall treatment plan for this injury?
   - [ ] Yes
   - [ ] No

21t. How many weeks since the injury?
   - [ ] Less than 1 week
   - [ ] 1-2 weeks
   - [ ] 3-4 weeks
   - [ ] 5-6 weeks
   - [ ] 7-8 weeks
   - [ ] More than 8 weeks

21u. How many times in total have you been injured in the following location(s)? Please mark "0" if you have not sustained any injuries to your body in these locations.
   - [ ] Lower leg
   - [ ] Lower back
   - [ ] Other: (please specify)____________________

21v. How many times have you performed with a specific injury in the following categories?
   - [ ] Head
   - [ ] Neck
   - [ ] Arm
   - [ ] Finger(s)
   - [ ] Upper/mid back
   - [ ] Other: (please specify)____________________

21w. What was your overall treatment plan for this injury?
   - [ ] Yes
   - [ ] No

21x. How many weeks since the injury?
   - [ ] Less than 1 week
   - [ ] 1-2 weeks
   - [ ] 3-4 weeks
   - [ ] 5-6 weeks
   - [ ] 7-8 weeks
   - [ ] More than 8 weeks

21y. How many times in total have you been injured in the following location(s)? Please mark "0" if you have not sustained any injuries to your body in these locations.
   - [ ] Lower leg
   - [ ] Lower back
   - [ ] Other: (please specify)____________________

21z. How many times have you performed with a specific injury in the following categories?
   - [ ] Head
   - [ ] Neck
   - [ ] Arm
   - [ ] Finger(s)
   - [ ] Upper/mid back
   - [ ] Other: (please specify)____________________

22. How often do you observe the following features in your current production?
   - [ ] Rarely
   - [ ] Occasionally
   - [ ] Frequently
SURVEY OF WEST END PERFORMERS

23. Do you feel that making a claim for compensation with Equity may be detrimental to PERFORMERS' careers. 
   () Not bad to their careers 
   () Possibly bad to their careers 
   () Definitely bad to their careers 

24. Do you believe that warm-up before a performance is generally necessary? 
   () Yes 
   () No 

25. How often do you believe the following conditions MAY CONTRIBUTE TO PERFORMERS' INJURIES: 
   a. Feature of choreography or direction that place performers at risk? () Never  () Seldom  () Occasionally  () Frequently 
   b. Insufficient sleep? () Never  () Seldom  () Occasionally  () Frequently 
   c. Cigarette smoking? () Never  () Seldom  () Occasionally  () Frequently 
   d. Having roles that push performers to their physical limits? () Never  () Seldom  () Occasionally  () Frequently 
   e. Inadequate warm-up? () Never  () Seldom  () Occasionally  () Frequently 
   f. Performance ignoring physical fatigue? () Never  () Seldom  () Occasionally  () Frequently 
   g. Inefficient physical conditioning? () Never  () Seldom  () Occasionally  () Frequently 
   h. Performers ignoring their own pain? () Never  () Seldom  () Occasionally  () Frequently 
   i. Stress from a performer's personal life? () Never  () Seldom  () Occasionally  () Frequently 
   j. Excessive pressure on performer by choreographer? () Never  () Seldom  () Occasionally  () Frequently 
   k. Performance pressure by other performers? () Never  () Seldom  () Occasionally  () Frequently 
   l. Poor nutrition or diet? () Never  () Seldom  () Occasionally  () Frequently 
   m. Alcohol or drug consumption? () Never  () Seldom  () Occasionally  () Frequently 
   n. Excessive demands by director/choreographer to have the overall performance shine? () Never  () Seldom  () Occasionally  () Frequently 

26. Please estimate the chance that the following problems will be faced (within the next 12 months) by a performer comparable to yourself in experience, physical conditioning and expertise. 

   **Percent chance (%)** 10 20 30 40 50 60 70 80 90 100
   - Shite will be injured during training or exercising. 0 0 0 0 0 0 0 0 0 0
   - Shite will sustain an injury that was caused by the mistakes of another person involved in the show. 0 0 0 0 0 0 0 0 0 0
   - Shite will be severely injured from his/her own mistakes. 0 0 0 0 0 0 0 0 0 0
   - Shite will miss 10 or more performances due to injury. 0 0 0 0 0 0 0 0 0 0
   - Shite will be injured due to faulty props or equipment. 0 0 0 0 0 0 0 0 0 0
   - Shite will have an injury that requires surgery. 0 0 0 0 0 0 0 0 0 0
   - Shite will push himself/herself to the physical limits and sustain an injury. 0 0 0 0 0 0 0 0 0 0

27. How sure or confident are you that you PERSONALLY CAN PREVENT the following situations from occurring in the next 12 months? 

   - Having an injury due to the deterioration of your technique or physical conditioning. 1 2 3 4 5 6
   - Having an injury due to your not taking precautions when you are fatigued. 1 2 3 4 5 6
   - Having an injury due to your own lack of concentration or caution. 1 2 3 4 5 6
   - Having an injury because more serious because of your not seeking therapy or consultation. 1 2 3 4 5 6
   - Having an injury because of having an inadequate warm-up or stretch. 1 2 3 4 5 6
   - Having an injury because you pushed yourself beyond your physical limits. 1 2 3 4 5 6

SURVEY OF WEST END PERFORMERS

28. Please indicate how much you agree with each of the following items. 

<table>
<thead>
<tr>
<th>Agree</th>
<th>Agree</th>
<th>Agree</th>
<th>Agree</th>
<th>Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

   a. I have excellent muscles. 
   b. I can do anything that is required. 
   c. I am always optimistic about my future. 
   d. I worry about my future. 
   e. I feel that my colleagues are more efficient than I am. 

29. Approximate the likelihood that the following will happen to YOU within the next 12 months? 

   **Percent chance (%)** 10 20 30 40 50 60 70 80 90 100
   - You will miss 10 or more performances due to injury. 0 0 0 0 0 0 0 0 0 0
   - You will be injured due to faulty props or equipment. 0 0 0 0 0 0 0 0 0 0
   - You will push yourself to your physical limits and sustain an injury. 0 0 0 0 0 0 0 0 0 0
   - You will be injured during training or exercising. 0 0 0 0 0 0 0 0 0 0
   - You will sustain an injury that was caused by the mistakes of another person involved in the show. 0 0 0 0 0 0 0 0 0 0
   - You will have an injury that requires surgery. 0 0 0 0 0 0 0 0 0 0
   - You will be severely injured from your own mistakes. 0 0 0 0 0 0 0 0 0 0

END OF SURVEY

Please make sure all the appropriate pages of the survey were completed. We would appreciate your writing additional comments and questions here, or attach a separate page to the survey.

Thank you very much for your participation!

Randolph W. Evans, M.D.
Professor of Anatomy, University of Texas at Houston Medical School and Baptist College of Medicine.

Richard J. Evans, Ph.D., and Scott C. Caravajal, M.A.
Department of Psychology, The University of Houston, Texas.
Survey of injuries among West End performers.

R W Evans, R I Evans and S Carvajal

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