

Preventing Oral and Facial Injuries: Population-Based Interventions to Encourage Use of Helmets, Facemasks, and Mouthguards in Contact Sports

Summary Evidence Table

Awareness Campaigns

Study Details	Characteristics	Participants	Interventions	Outcomes
<p>Author: Jolly et al. 1996</p> <p>Least: Uncontrolled interrupted time series</p> <p>Country of study: Australia</p> <p>Geographic location: Victoria</p>	<p>Unit of allocation: N/A</p> <p>Year commenced: 1991</p> <p>Year completed: 1994</p> <p>Recruitment: Clubs were recruited into the study based on their associations with old boys clubs, districts, educational institutes or businesses. Individuals were surveyed on an opportunity basis</p> <p>Length of intervention: 4 years (data collected at the 4 year mark is not reported fully, only data from the 1991 – 1992 period has been used)</p> <p>Sport: Australian rules football</p> <p>Level of play: Amateur (range of grades)</p> <p>Type of protection: Mouth guard</p> <p>Intervention type: Promotional campaign</p> <p>Funded by: Grant from the Victoria Health Promotion Foundation</p>	<p>Inclusion criteria: Players in the Victoria Amateur Football Association of any grade</p> <p>Exclusion criteria: Not reported</p> <p>Age range: 16-44 years</p> <p>Gender: Male</p> <p>SES: Though a range of occupations were reported, proportions were not assigned</p> <p>Number of Participants recruited: Data collection point 1, n=638; data collection point 2, n=770; data collection point 3, n=505; data collection point 4, n=698</p>	<p>1 Group</p> <p>A large scale promotional campaign was developed. Slogan: 'keep teeth for life, wear a mouth guard'. Further information was provided on custom guards and messages were distributed via media and local in club advertisement methods. Promotional materials were produced and widely distributed. Messages were visible at games</p>	<p>Outcome measure: Self-reported dental injuries; self-reported mouth guard use during matches and training described as: always wore mouth guard; sometimes wore mouth guard; never wore mouth guard; unknown</p> <p>Data:</p> <p><u>Injuries:</u></p> <p>Time point 1. 31%</p> <p>Time point 2. 31%</p> <p>Time point 3. 25%</p> <p>Time point 4. 26%</p> <p><u>Use:</u></p> <p>Time point 1.</p> <p><u>Matches:</u> 89% always; 8% sometimes; 2% never; 1% unknown</p> <p><u>Training:</u> 13% always; 34% sometimes; 51% never; 2% unknown</p> <p>Time point 2.</p> <p><u>Matches:</u> 89% always; 6% sometimes; 3% never; 2% unknown</p>

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				<p><u>Training</u>: 10% always; 31% sometimes; 57% never; 2% unknown</p> <p>Time point 3.</p> <p><u>Matches</u>: 90% always; 7% sometimes; 1% never; 2% unknown</p> <p><u>Training</u>: 14% always; 40% sometimes; 45% never; 1% unknown</p> <p>Time point 4.</p> <p><u>Matches</u>: 88% always; 8% sometimes; 2% never; 2% unknown</p> <p><u>Training</u>: reported data, not usable.</p>
<p>Author: Eime et al. 2005</p> <p>Greatest: Controlled interrupted time series study</p> <p>Country of study: Australia</p> <p>Geographic location: Victoria</p>	<p>Unit of allocation: Cluster</p> <p>Year commenced: 2002</p> <p>Year completed: 2003</p> <p>Recruitment: Opportunity recruitment on site at squash venues</p> <p>Length of intervention: 4 months</p> <p>Sport: Squash</p> <p>Level of play: Leisure</p> <p>Type of protection: Eyewear</p> <p>Intervention type: Promotion program</p> <p>Funded by: NHMRC translation Grant</p>	<p>Inclusion criteria: Adult squash players present in the squash venues at the time of data collection</p> <p>Exclusion criteria: Not reported</p> <p>Mean age range: 37-39 years</p> <p>Gender: 60-80% male</p> <p>SES: Not reported</p> <p>Number of Participants recruited: post-intervention = 349 and post-control = 209</p>	<p>2 Groups:</p> <p>Group 1: Protective Eyewear Promotion program (PEP) designed based on ecological theory and previous research. Objectives were around altering the environment to make eyewear available, improving awareness and affecting attitudes to encourage compliance. Incentives were reported</p> <p>Group 2: Control (geographically far from intervention venues to limit contamination)</p>	<p>Outcome measure: %equipment use; mean score in attitude change (adjusted for confounding)</p> <p>Data:</p> <p><u>% equipment use:</u></p> <p>Group 1: Pre 17.5%; post 21.2%</p> <p>Group 2: Pre 13%; post 17.2%</p>

Mandate of Equipment Use

Study Details	Characteristics	Participants	Interventions	Outcomes
<p>Author: Benson et al. 1999</p> <p>Greatest: Prospective cohort study</p> <p>Country of study: Canada</p> <p>Geographic location: Ontario and Canada West</p>	<p>Unit of allocation: Cluster</p> <p>Year commenced: 1997/98</p> <p>Year completed: 1998/99</p> <p>Recruitment: Teams were selected for geographical reasons</p> <p>Length of intervention: 1 season</p> <p>Sport: Ice hockey</p> <p>Level of play: National University league with 4 divisions</p> <p>Type of protection: Face shield (full face vs half face)</p> <p>Intervention type: Mandate</p> <p>Funded by: Canadian Hockey Association and Olympic Oval Research Fund</p>	<p>Inclusion criteria: Teams were participating in the Canadian inter-University union hockey competition. Individuals were male ice hockey players in these teams</p> <p>Exclusion criteria: Not reported</p> <p>Median age: 22 years (range 17-29 years)</p> <p>Gender: Male</p> <p>SES: Not Reported</p> <p>Number of Participants recruited: 642</p>	<p>2 Groups:</p> <p>All participants in both groups were subject to the same level of mandate enforcing the use of face shields for play. Variation existed only in the type of face shield required</p> <p>Group 1: Were subject to the Ontario mandate requiring them to wear full face shields, n=319</p> <p>Group 2: Were subject to the Canada West mandate which required them to wear a minimum of a half face shield, n=323</p>	<p>Outcome measure: injury incidence; injury rate; relative risk. Injury is defined by: head and face injuries; concussion</p> <p>Data: <u>Injuries:</u></p> <p>Group 1: 34 injuries</p> <p>Group 2: 95 injuries</p>
<p>Author: Webster et al. 1999</p> <p>Moderate: Uncontrolled interrupted time series</p> <p>Country of study: U.S.</p> <p>Geographic location: New York Central</p>	<p>Unit of allocation: No allocation</p> <p>Year commenced: 1995</p> <p>Year completed: 1996</p> <p>Recruitment: Not reported</p> <p>Length of intervention: 2 years</p> <p>Sport: Lacrosse</p>	<p>Inclusion criteria: Not reported</p> <p>Exclusion criteria: Not reported</p> <p>Mean age range: 13-18 years</p> <p>Gender: Female</p> <p>SES: Not reported</p>	<p>1 Group:</p> <p>Unclear intervention, may be mandate or regulation, 1995 n=683; 1996 n=703</p>	<p>Outcome measure: Injuries (injuries to craniofacial area); Injury rate (per 1000 exposures)</p> <p>Data:</p> <p>1995: 28 injuries</p> <p>1996: 27 injuries</p>

Study Details	Characteristics	Participants	Interventions	Outcomes
	<p>Level of play: Junior and varsity</p> <p>Type of protection: Eye goggles</p> <p>Intervention type: Unclear, possibly mandate</p> <p>Funded by: National Operating Committee for Standards on Athletic Equipment and the Department of Orthopedic Surgery, Syracuse</p>	<p>Number of Participants recruited: 1995 n=683; 1996 n=703</p>		

Provision of Equipment at No or Reduced Cost

Study Details	Characteristics	Participants	Interventions	Outcomes
<p>Author: deWet et al. 1981</p> <p>Greatest: Controlled cohort study</p> <p>Country of study: South Africa</p> <p>Geographic location: Not reported</p>	<p>Unit of allocation: Cluster</p> <p>Year commenced: Not reported</p> <p>Year completed: Not reported</p> <p>Recruitment: Children were accessed via schools</p> <p>Length of intervention: 1 season</p> <p>Sport: Primary school rugby</p>	<p>Inclusion criteria: All of the boys had Angle Class I jaw relationships</p> <p>Exclusion criteria: Not reported</p> <p>Mean age range: 10-13 years</p> <p>Gender: Male</p> <p>SES: Not reported</p> <p>Number of Participants recruited: n=150</p>	<p>2 Groups:</p> <p>Group 1: The boys were fitted with custom made mouth guards fitted by operators and the boys received instruction as to the care of the mouth guards (hygiene in particular). The guards were altered or corrected throughout the season where necessary. Coaches also received mouth guards, n=75</p>	<p>Outcome measure: Rates of injury (defined as tooth injury; lip injury; other soft tissue injury; concussion; neck/TMJ injury); equipment use</p> <p>Data:</p> <p><u>Craniofacial:</u></p> <p>Group 1: 26.6%</p> <p>Group 2: 86.6% (excludes concussion)</p> <p><u>Dental Injury:</u></p> <p>Group 1: 0%</p>

Study Details	Characteristics	Participants	Interventions	Outcomes
	<p>Level of play: Primary school</p> <p>Type of protection: Custom fitted mouthguards</p> <p>Intervention type: Provision</p> <p>Funded by: University of Pretoria research award</p>		<p>Group 2: Usual behaviors, n=75</p>	<p>Group 2: 21.3%</p> <p><u>Use:</u></p> <p>Group 1: Every game 58.6%; most games 29.33%</p> <p>Group 2: No use data reported (authors assume 0%)</p>
<p>Author: Barbic et al. 2005</p> <p>Greatest: Cluster RCT</p> <p>Country of study: Canada</p> <p>Geographic location: Ontario</p>	<p>Unit of allocation: Cluster</p> <p>Year commenced: 2003</p> <p>Year completed: 2003</p> <p>Recruitment: Teams and participants were accessed via universities</p> <p>Length of intervention: 1 season</p> <p>Sport: Rugby and football</p> <p>Level of play: Inter-university competitions</p> <p>Type of protection: WIPSS 'brain-pad' mouthguards</p> <p>Intervention type: Provision</p> <p>Funded by: Ontario Neurotrauma Foundation</p>	<p>Inclusion criteria: Those participating in inter-university sports teams and registered as a student at a participating university. At least 16 years old and physically able to compete in contact sports</p> <p>Exclusion criteria: Known history of seizures, epileptic episodes, or similar neurological sequelae</p> <p>Mean age: 20 years</p> <p>Gender: Male only (football); male and female (rugby)</p> <p>SES: Not Reported</p> <p>Number of Participants recruited: 646</p>	<p>2 Groups:</p> <p>Group 1: Were provided with the WIPSS 'brain-pad', n=322</p> <p>Group 2: Continued to use their own mouthguards, n=324</p>	<p>Outcome measure: Rate of concussions; rate of dental trauma</p> <p>Data:</p> <p><u>Concussions:</u></p> <p>Group 1: 7.1%</p> <p>Group 2: 6.8%</p> <p><u>Dental trauma:</u></p> <p>Group 1: 0%</p> <p>Group 2: 0%</p>
<p>Author: McIntosh et al. 2009</p> <p>Greatest: Cluster randomized controlled trial</p>	<p>Unit of allocation: Cluster</p> <p>Year commenced: 2002</p> <p>Year completed: 2003</p>	<p>Inclusion criteria: Rugby teams in clubs or school based competitions in the under 13s, 15s, 18s and 20s teams (any grade)</p>	<p>3 Groups:</p> <p>Group 1: Standard headgear provision, n=1128</p>	<p>Outcome measure: Game* injuries and missed game** injuries for: Head injury (injury count; injury rates). Concussion (injury count;</p>

Study Details	Characteristics	Participants	Interventions	Outcomes
<p>Country of study: Australia</p> <p>Geographic location: Not reported</p>	<p>Recruitment: From schools and clubs</p> <p>Length of intervention: 2 years</p> <p>Sport: Rugby union football</p> <p>Level of play: Various grades in school level competitions</p> <p>Type of protection: Headgear (standard and modified)</p> <p>Intervention type: provision</p> <p>Funded by: Grant from the International Rugby Board</p>	<p>Exclusion criteria: Not reported</p> <p>Age range: 12-21 years</p> <p>Gender: Male</p> <p>SES: Not reported</p> <p>Number of Participants recruited: N=4095</p>	<p>Group 2: Modified headgear provision, n=1474</p> <p>Group 3: No headgear was provided but was permitted, n=1493</p>	<p>injury rates). Equipment use (% of use per exposure)</p> <p>*game injuries refer to injuries which cause players to leave the game; **missed game injuries refer to injuries that cause players to miss the following game also</p> <p>Data:</p> <p><u>Game head injuries:</u></p> <p>Group 1: 56 injuries; injury rate 6.9 (95% CI 5.3-8.9)</p> <p>Group 2: 96 injuries; injury rate 9 (95% CI 7.4-11)</p> <p>Group 3: 82 injuries; injury rate 8.2 (95% CI 6.6-10.1)</p> <p><u>Use:</u></p> <p>Group 1: 59.9%</p> <p>Group 2: 58.8%</p> <p>Group 3: 51.9%</p> <p>N.B. head injuries here refer to injuries to the cranium only and exclude the face</p>
<p>Author: Finch et al. 2005</p> <p>Greatest: Cluster randomized controlled trial</p> <p>Country of study: Australia</p> <p>Geographic location: Not reported</p>	<p>Unit of allocation: Cluster</p> <p>Year commenced: 2001</p> <p>Year completed: 2001</p> <p>Recruitment: Invitation to all teams participating in the district Australian rules football competition</p> <p>Length of intervention: 1 season</p>	<p>Inclusion criteria: Players from the under 16s and under 18s and open competition players</p> <p>Exclusion criteria: Elite or high level players</p> <p>Mean age range: 16-26 years</p> <p>Gender: Male (assumed)</p>	<p>2 Groups:</p> <p>Group 1: Provision of mouth guards, n=190</p> <p>roup 2: Control, mouth guards were not provided to this group though they were permitted, n=111</p> <p>N.B. This study was originally a 4 arm trial incorporating head gear as well as mouth</p>	<p>Outcome measure: Injury - incident rate ratio (95% CI); equipment use – median % (reported ranges are unclear)</p> <p>Data:</p> <p><u>Injuries:</u></p> <p>Group 1: 1.8 (1.1-2.9)</p> <p>Group 2: 4.4 (2.2-8.9)</p> <p><u>Use:</u></p> <p>Group 1: 52.7%</p>

Study Details	Characteristics	Participants	Interventions	Outcomes
	<p>Sport: Australian rules football</p> <p>Level of play: District competition</p> <p>Type of protection: Mouthguards</p> <p>Intervention type: provision</p> <p>Funded by: Not reported</p>	<p>SES: Not reported</p> <p>Number of Participants recruited: n=301</p>	<p>guards. The arms were collapsed into 2 due to drop-out rate. Consequently, uneven numbers in groups 1 and 2 may have been using headgear in addition to or instead of mouth guards</p>	<p>Group 2: 37%</p>