



# Musculoskeletal injuries and the effects on quality of life and social and emotional well-being in an Australian Aboriginal population

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**Disclaimer:** In some instances in this paper I will be using the term 'Aboriginal' to describe both Aboriginal and Torres Strait Islander people. This is due to word restrictions, and no disrespect is intended to any individual or group.

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## Abstract

**Background:** Aboriginal Australians are very athletic, and this is evident with their participation at national and international sports and athletics. Studies have shown Aboriginal people have high prevalence of musculoskeletal injury. However no research has investigated the impact of musculoskeletal injury on weight gain, treatment, quality of life, and social and emotional wellbeing.

**Methods:** A total of 193 Aboriginal community members volunteered to provide information via an Aboriginal Multiple Injury Questionnaire. Participants were asked to self-report if they previously or currently have ankle, knee or back injury. If they had a current ankle, knee or back injury, they were then asked the relevant questions about their injury.

**Results:** Musculoskeletal injuries were highly prevalent, 60 (31%) had a current ankle injury, 52 (27%) indicated they had a current knee injury, and 87 (45%) had a current back injury. Participants rated their injury as painful, problematic, contributed to weight gain, and caused them to lose sleep, yet 70% (ankle), 63% (knee) and 48% (back) had no form of treatment for their injury. Quality of life questions were significantly moderately to strongly correlate with each other and with the social and emotional well-being measures.

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**Conclusion:** Aboriginal people have high percentages of musculoskeletal injuries which are correlated with reduced quality of life and social and emotional wellbeing. Ankle, knee and back injuries can be debilitating, and many participants indicated that their injuries resulted in weight gain and loss of sleep. Although participants rated most measures high on scale, many had not had any form of treatment for their injuries which likely contributed to reduced quality of life and social and emotional well-being.

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## Background

Aboriginal Australians are very athletic, and they have been for many thousands of years [1-4], this has been an evolutionary process, where Aboriginal people have been required to be athletic and have physical endurance over the millennia to survive [3, 5]. Playing sport is very important to many Aboriginal cultures, and ball games were played by many different Aboriginal tribes [4, 6]. These football games were culturally important and the whole community participated [4]. Being athletic was also required for hunting, and this would have required great physical fitness [7]. The athleticism of ancient Aboriginal Australians has been documented in foot prints at Lake Mungo in the Willandra Lakes area of NSW [8, 9]. Although there is evidence that ancient Aboriginal Australians were athletic, there is also evidence of musculoskeletal injury in ancient skeletal remains of the Kurna people found in Adelaide, South Australia [1]. The Kurna people's ancestors had evidence of bone spurs on the calcaneus (heel bone) possibly from chronic Achilles strain [1]. The Kurna people's bones also exhibited signs of inflammatory joint disease [1]. Modern Aboriginal men participate in various national football competitions in very high numbers [10]. The modern culture of Aboriginal sport is no more evident than with the participation in various State and National Aboriginal NRL, AFL, netball and cricket carnivals [11-14]. Although there is ample evidence of athleticism of ancient and modern Aboriginal people, several studies have found musculoskeletal injury is high in some Aboriginal communities [2, 15-17], especially in rural and remote areas [18]. A study also found high rates of musculoskeletal injury in young Aboriginal rugby league players, although the numbers were small (n=24) [19]. This high rate of injury have also been reported in Indigenous communities internationally [20]. Some research has found an association with musculoskeletal injury and foot pressure in Aboriginal Australians, especially mid-foot pressure and the amount of time spent on the mid-foot during gait [2]. Although there has been some investigation in to musculoskeletal injury in Aboriginal communities, examination of possible causes has been limited [2, 15-17, 21]. Research is needed to investigate the effect that musculoskeletal injury has on quality of life (QOL) and social and emotional well-being (SEW) for Aboriginal people. This study is designed to investigate the level of musculoskeletal injuries and their negative effect on QOL, SEW, weight gain, sleep and level of treatment, through the use of the Aboriginal Multi Injury Questionnaire (AMIQ) [22].

## Ethics approval

Ethical approval was granted from the Human Research Ethics Committee (HREC) at the University of Newcastle (Protocol Number 2012-0385) and the Aboriginal Health and Medical Research Council Ethics Committee (Reference Number 895/12). Three Aboriginal communities participated in this study, Mt Druitt (Western Sydney), Newcastle (Hunter Region) and Forster (Mid North Coast) in New South Wales, Australia. Four Aboriginal organisations supported this project, Western Sydney Aboriginal Medical Service (Mt Druitt), Awabakal Aboriginal Medical Service (Newcastle), the Wollotuka Institute (Newcastle), and Tobwabba Aboriginal Medical Service (Forster), NSW, Australia.

## Methods

A total of 193 Aboriginal community members volunteered to provide information about personal musculoskeletal injury. There were 68 (32%) males, 125 (68%) females and they were aged 18-88 years (mean age 51 years). There were 75 (38.9%) participants who came from Mt Druitt, 64 (33.2%) from Newcastle, and 54 (28%) from Forster NSW Australia. The participants that agreed to take part in the study were assigned an identification number to de-identify results. All participants were required to be Aboriginal, and over 18 years old. After volunteering and signing a consent form, participants were able to withdraw at any stage without explanation.

The Aboriginal Multiple Injury Questionnaire (AMIQ) was developed specifically to evaluate musculoskeletal injury in Aboriginal and Torres Strait Islander populations [22], from a modified Bristol Foot Score (BFS) [23]. The AMIQ is patient centred, reliable, valid and culturally appropriate and was used to assess if participants had a previous or current ankle, knee or back injury. The AMIQ consists of 10 questions, most questions having a 3-6 point rating system, evaluating pain, mobility, weight gain, sleep, treatment, QOL and SEW [22]. The AMIQ also has a quantitative summary score which can be used to rate the overall effect an injury has on an individual. The AMIQ summary score rating system is simple and effectively gives the health professional, or researcher and Aboriginal community members the level of impact of an injury i.e. <11 (not a problem), 11-20 (minor problem), 21-30 (moderate problem), 31-40 (major problem) and 41-53 (extreme problem) [22].

## Data analysis

All participants were surveyed about ankle, knee and back injury with the AMIQ. Participants were asked if they had a previous or current ankle, knee or back injury. Those with a current injury were asked the relevant questions for that injury from the AMIQ [22]. Statistical analysis was performed using the Statistical Package Social Science software version 21.0 (SPSS Chicago, Illinois, USA) which was used to calculate percentages of injuries, percentages of specific answers to AMIQ questions and correlations. The correlations were set at \* significant at 0.05 level (2 tailed) and \*\* significant at 0.01 level (2 tailed). Correlation coefficients were interpreted as 0.1 poor/weak, 0.3 moderate and 0.5 strong, as suggested by Cohen 1988 [24].

## Results

Ankle Injury: 127 (66%) of Aboriginal participants had a previous ankle injury and 60 (31%) indicated they had a current ankle injury. When participants were asked to rate the pain of their current ankle injury, 16 (27%) said 'very painful' and 13 (22%) said 'extremely painful', the two highest ranking answers.

When rating QOL questions (Q2 Ankle, Q3 Ankle, Q4 Ankle), 35 (58%) participants rated 'standing' (Q2 Ankle) a 'moderate' or a 'major' problem. There were 34 (56%) participants who also rated walking a short distance (Q3 Ankle) as either a 'moderate' or a 'major' problem. The participants also rated the final QOL question (Q4 Ankle) related to 'activity' as 43 (72%) 'moderate' or a 'major' problem, the two highest ranking answers.

QOL measures (Q2 Ankle, Q3 Ankle, Q4 Ankle) were found to have a significant moderate to strong correlations with each other (Table 1). QOL measures (Q2 Ankle, Q3 Ankle, Q4 Ankle) also had a significant strong correlation with the SEW measure (Q6 Ankle) (Table 1).

There were 34 (57%) respondents who thought that their ankle injury had contributed to gaining weight in the past 6 months. There were 32 (53%) participants who said their current ankle injury had caused them to lose sleep in the past 6 months. When participants were asked to evaluate their ankle injury overall, 28 (47%) rated it as 'poor', which is the lowest ranking. There were 36 (60%) participants who had an AMIQ Ankle summary score of 21-30 (moderate problem), which is the middle ranking answer on a 5 point scale. There were 42 (70%) who had no form of treatment for their ankle injury.

**Table 1 Correlations with QOL measures (Q2 Ankle, Q3 Ankle, Q4 Ankle) and the social and emotional well-being measure (Q6 Ankle)**

		Q2 Ankle	Q3 Ankle	Q4 Ankle	Q6 Ankle
Q2 Ankle	Pearson Correlation	1	.400**	.337**	.494**
	Sig. (2-tailed)		.002	.008	.000
	N	60	60	60	60
Q3 Ankle	Pearson Correlation	.400**	1	.278*	.409**
	Sig. (2-tailed)	.002		.032	.001
	N	60	60	60	60
Q4 Ankle	Pearson Correlation	.337**	.278*	1	.475**
	Sig. (2-tailed)	.008	.032		.000
	N	60	60	60	60
Q6 Ankle	Pearson Correlation	.494**	.409**	.475**	1
	Sig. (2-tailed)	.000	.001	.000	
	N	60	60	60	60

Knee Injury: 105 (54%) Aboriginal participants had a previous knee injury, and 52 (27%) indicated they had a current knee injury. When participants were asked how often they have pain with their current knee injury, 22 (43%) said 'most of the time' or 'all of the time'.

When rating QOL questions (Q2 Knee, Q3 Knee, Q4 Knee) for knee injury, 29 (57%) of participants rated 'standing' (Q2 Knee) as 'moderate' or a 'major problem'. There were 28 (55%) participants who also rated walking a short distance (Q3 Knee) as either a 'moderate' or a 'major problem'. The participants also rated the final QOL question related to 'activity' (Q4 Knee) as 37 (73%) 'moderate' or a 'major' problem.

QOL measures (Q2 Knee, Q3 Knee, Q4 Knee) were found to have a significant moderate to strong correlations with each other (Table 2). QOL measure Q2 Knee has a significant moderate correlation with the SEW measure (Q6 Knee), and Q4 Knee has a significant strong correlation with the SEW measure (Q6 Knee) (Table 2).

There were 20 (38%) participants thought that their knee injury had contributed to gaining weight in the past 6 months. There were 35 (67%) participants who said their current knee injury had caused them to lose sleep in the past 6 months. When participants were asked to evaluate their knee injury overall, 25 (49%) rated it as 'poor', which is the lowest ranking. There were 31 (60%) participants who had an AMIQ Knee summary score of 21-30 (moderate problem). There were 33 (63%) participants who had no form of treatment for their current knee injury.

**Table 2 Correlations with QOL measures (Q2 Knee, Q3 Knee, Q4 Knee) and the social and emotional well-being measure (Q6 Knee)**

		Q2 Knee	Q3 Knee	Q4 Knee	Q6 Knee
Q2 Knee	Pearson Correlation	1	.462**	.314*	.306*
	Sig. (2-tailed)		.001	.025	.029
	N	51	51	51	51
Q3 Knee	Pearson Correlation	.462**	1	.204	.094
	Sig. (2-tailed)	.001		.151	.514
	N	51	51	51	51
Q4 Knee	Pearson Correlation	.314*	.204	1	.474**
	Sig. (2-tailed)	.025	.151		.000
	N	51	51	51	51
Q6 Knee	Pearson Correlation	.306*	.094	.474**	1
	Sig. (2-tailed)	.029	.514	.000	
	N	51	51	51	51

Back injury: 121 (63%) Aboriginal participants stated they had a previous back injury, and 87 (45%) stated they had a current back injury. When participants were asked how often participants have pain with their current back injury, 59 (68%) said 'most of the time' or 'all of the time'.

When rating QOL questions (Q2 Back, Q3 Back, Q4 Back) for back injury, 56 (64%) participants rated 'standing' (Q2 Back) as 'moderate' or a 'major' problem. There were 41 (47%) participants who also rated walking a short distance (Q3 Back) as either a 'moderate' or a 'major problem'. The participants also rated the final QOL question related to 'activity' (Q4 Back) as 53 (61%) 'moderate' or a 'major' problem.

QOL measures (Q2 Back, Q3 Back, Q4 Back) were found to have a significant moderate to strong correlations with each other (Table 3). QOL measures (Q2 Back, Q3 Back, Q4 Back) also have a significant moderate correlation with the SEW measure (Q6 Back) (Table 3).

There were 46 (53%) participants who thought that their back injury had contributed to gaining weight in the past 6 months. There were 67 (77%) participants who said their current back injury had caused them to lose sleep in the past 6 months. When participants were asked to evaluate their back injury overall, 39 (45%) rated it as 'poor', which is the lowest ranking answer. There were 50 (57%) participants who had an AMIQ Back summary score of 21-30 (moderate problem). There were 42 (48%) participants who had no form of treatment for their current back injury.

**Table 3 Correlations with QOL measures (Q2 Back, Q3 Back, Q4 Back) and the social and emotional well-being measure (Q6 Back)**

		Q2 Back	Q3 Back	Q4 Back	Q6 Back
Q2 Back	Pearson Correlation	1	.366**	.355**	.344**
	Sig. (2-tailed)		.000	.001	.001
	N	87	87	87	87
Q3 Back	Pearson Correlation	.366**	1	.486**	.306**
	Sig. (2-tailed)	.000		.000	.004
	N	87	87	87	87
Q4 Back	Pearson Correlation	.355**	.486**	1	.332**
	Sig. (2-tailed)	.001	.000		.002
	N	87	87	87	87
Q6 Back	Pearson Correlation	.344**	.306**	.332**	1
	Sig. (2-tailed)	.001	.004	.002	
	N	87	87	87	87

## Discussion

The participants in this study have very high percentages of previous and current musculoskeletal injuries, similar to the results of other studies [15-19, 21]. The results of this study indicate that Aboriginal people in these communities experience high level and frequency of pain with their musculoskeletal injuries. This high level and frequency of pain has impacted on the QOL and SEW of the Aboriginal participants with current injuries. Although there were three distinct questionnaires for the different injuries that make up the AMIQ i.e. Ankle, Knee and Back, the results from many of the questions from the different questionnaires are incredibly similar. The results of the rating of QOL measures for ankle and knee injury are all within 1% of each other and back injury were also very similar results. This shows the reliability of the AMIQ, but also demonstrates the very equal negative effect that these different injuries have on the QOL of the Aboriginal people in this study. There were also a great deal of similarities between the significant moderate and strong correlations between QOL measures and the SEW measure for all injuries (Tables 1, 2, 3). These similarities also demonstrated the equal negative impact these injuries have on SEW for the Aboriginal participants. Although self-reported, and there is no way of establishing if any weight gain was directly related to musculoskeletal injuries, large similar percentages (Ankle 57%, Knee 38%, Back 53%) for all injuries, showed participants consistently felt they had gained weight as a result of their injury(s).

Musculoskeletal injuries, can be debilitating, causing sufferers to reduce or stop activity, which may lead to weight gain, becoming overweight or even obese (with time), which is very high in the Aboriginal and Torres Strait Islander population [25]. Very high percentages (Ankle 53%, Knee 67%, Back 77%) of participants stated the level of pain related to their injuries resulted in loss of sleep. Loss of sleep can have dramatic negative effects on cognitive function, QOL and SEW [26, 27]. Reduced sleep has been linked to many complications, including inability to focus, irritability [27], day time sleepiness, and cognitive impairment [26] which will also impact on QOL and SEW. Like many of the findings in this study, the results for participants rating their injuries overall were extremely similar (Ankle 47%, Knee 49%, Back 45%) for the different injuries, with approx. half of participants rating their injuries as poor.

Although many participants rated their injuries as painful, problematic, contributed to weight gain, and caused them to lose sleep, very large numbers i.e. 70% (ankle), 63% (knee), and 48% (back) had not had any form of treatment for their injuries. These results may demonstrate the inadequate level of treatment available for some Aboriginal communities. This lack of treatment is a serious concern and likely a strong contributor to reduced QOL and SEW. There are likely many complex reasons for the lack of treatment for the Aboriginal participants in this study. Some of the documented reasons for Aboriginal people not seeking or receiving treatment are financial, trust, location, transport, literacy (health literacy), lack of engagement and culturally issues [19, 28-33]. The Aboriginal community want to have a 'voice' in their health care, health education and involvement in research [32], therefore engagement and consultation with the Aboriginal community is paramount. Without engagement, it is unlikely that Aboriginal people will feel culturally safe enough to trust a health professional to seek treatment or participate in research. It is well documented that education and literacy levels are low in many Aboriginal communities [30, 33], therefore often 'health literacy' will be low in many cases. Some Aboriginal community members may not be aware of what treatment benefits a podiatrist, physiotherapist, or chiropractor can provide for musculoskeletal injuries. Problems with health literacy are also related with engagement and consultation e.g. talking to the Aboriginal community about proposed interventions may encourage attendance for treatment. It can be very expensive to receive treatment for musculoskeletal injuries, and it is well documented Aboriginal Australians have less income than non-Aboriginal Australians [28]. Access to treatment for musculoskeletal injury and other health problems can be a serious issue for many Aboriginal communities, especially in rural and remote areas [34]. Place of residence is considered an extremely important aspect of Aboriginal health, particularly access to health service in different residential areas [34]. Approximately 22% of all Aboriginal people live in inner regional

centres, and 21% live in outer regional areas, compared to 18% and 9% respectively of non-Aboriginal Australians [35]. Location of residence makes a difference to access to health care for Aboriginal people [36]. People living in rural and remote areas are far more likely to suffer from poor health outcomes [29], and far less likely to have private health insurance [29]. Often private health insurance is required to visit allied health professionals [29] e.g. podiatrist, physiotherapist, and chiropractors, and often there are limited practitioners in rural and remote areas, which limits access for Aboriginal people.

The AMIQ summary scores for the different injuries were overwhelmingly rated as a moderate problem (Ankle 60%, Knee 60%, Back 57%), which is the middle ranking on a 5 point scale, these percentages are incredibly similar to each other, with ankle and knee being exactly the same, and back injury being just 3% lower. As with many of the measures this shows the reliability of the AMIQ, but possibly indicate that Aboriginal people have a high pain tolerance, and highly resilient to effects of suffering with injuries.

## Limitation

Although attempts were made to have approximately equal amounts of male and female volunteers, approximately twice the number of females volunteered to participate and this is not a representation of gender balance in the Aboriginal and Torres Strait Islander population. Although this study had approximately equal amounts of participants from all three participating communities, they were volunteers and this was not a random sample. Therefore the findings of this project are not representative of all Aboriginal and Torres Strait Islander communities and caution should be used when interpreting the findings of this study.

## Conclusion

The results in this study have identified high rates of musculoskeletal injuries in the participants of this study. Many participants rated their injuries as painful, problematic, contributed to weight gain, and caused them to lose sleep, yet very large numbers had not had any form of treatment for their injuries. These results may demonstrate an inadequate level of treatment options for these injuries, which is a serious concern and likely a strong contributor to reduced QOL and SEW. This research indicates that much more attention to musculoskeletal injuries is needed in the Aboriginal and Torres Strait Islander community to diagnose and provide treatment for injury and pain.

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