Title: A retrospective review over 1999 to 2007 of head, shoulder and knee soft tissue and fracture-dislocation injuries and associated costs for rugby league in New Zealand

Running title: Injuries in rugby league

Authors: Doug A. King,[1, 2] Patria A. Hume,[2] Simon Gianotti,[2, 3] Trevor Clark[4]

1. Emergency Department
   Hutt Valley District Health Board
   Lower Hutt, New Zealand

2. Sport Performance Research Institute New Zealand
   School of Sport and Recreation
   Faculty of Health and Environmental Science
   Auckland University of Technology, New Zealand

3. Accident Compensation Corporation
   Wellington, New Zealand.

4. Institute of Food, Nutrition and Human Health
   College of Science
   Massey University Wellington
   Wellington, New Zealand

Correspondence to:
Doug King
Emergency Department
Hutt Valley District Health Board
Private Bag 31-907
Lower Hutt
New Zealand

Tel: +64 4 569 7835
Email: douglas.king@huttvalleydhb.org.nz

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Abstract

King et al.reported that of 5,941 moderate to serious claims resulting in medical treatment for rugby league injuries. The knee, shoulder, and head and neck body sites and soft tissue and fracture-dislocation injuries were most frequent and costly in the New Zealand national no-fault injury compensation corporation database during 1999 to 2007. However, additional analyses of knee, shoulder and head and neck body sites by soft tissue and fracture-dislocation injury types was required to enable a greater understanding of the nature of injuries most likely to be seen by sports medical personnel dealing with rugby league players. From 1999 to 2007 head and neck soft tissue injury claims (χ^2=26) and costs (χ^2=263), fracture-dislocation injury claims (χ^2=30) and costs (χ^2=279), shoulder soft tissue injury claims (χ^2=108) and costs (χ^2=783) and fracture-dislocation injury claims (χ^2=97) and costs (χ^2=1252) significantly increased. Knee soft tissue injury claims (χ^2=259) and costs (χ^2=1359) significantly decreased from 1999 to 2007. There was no significant difference in knee fracture-dislocation injury claims (χ^2=13, df=7, p=0.838) but there was a significant increase in knee fracture-dislocation injury costs (χ^2=160) from 1999 to 2007. Changes in the nature of injuries may be related to changes in defensive techniques employed in rugby league during this time. Sports medical personnel dealing with rugby league players should focus their injury prevention strategies on reducing musculoskeletal injuries to the head and shoulder. There should be a focus on increasing awareness of correct tackling technique, head injury awareness and management of suspected cervical spine injuries.

Introduction

Rugby league is a contact sport that is played internationally at junior, amateur, semi-professional and professional levels of participation [3]. As rugby league is an intermittent collision sport, the game requires participants to compete with a combination of muscular strength, stamina, endurance, speed, acceleration, agility, flexibility and aerobic endurance [14]. There is a risk of musculoskeletal injury occurring from both match and training activities due to the number of physical collisions and tackles that occur [11]. The most common injury sites have varied by different participation levels (professional rugby league: head and neck, knee and lower limb; semi-professional: shoulder, thigh and calf; amateur: head and neck, thigh and lower leg; junior: knee, shoulder) [11]. Injury type frequency has also varied by participation level with haematomas and sprains (professional, semi-professional and amateur) and fractures (junior) most frequent [11]. King et al. [10] reported that of the total 5,941 Moderate to Serious Claims (MSC) resulting in medical treatment for rugby league injuries, the knee (n=1,338, 23% of total claims, 225 per 1,000 total rugby league injury claims, $8,750,147 total costs, 20% of total costs), shoulder (1,006, 17%, 169/1,000, $6,856,788, 17 %) and head and neck (565, 10%, 95/1,000, $9,314,686, 22%) body sites were most frequent and costly in the New Zealand ACC national no-fault injury compensation corporation database during the period 1999 to 2007. King et al. [10] also reported that the most frequent and costly injury types were soft tissue injuries (n=2817, 47%, 474 /1,000, $17,324,214, 41% of total costs) and fracture-dislocation injuries (2618, 44.1%, 440/1,000, $16,935,094, 40%).

Previous studies reporting injuries in rugby league have not provided data on the injury types by the injury sites. Knowledge of the types of injuries that occur to a specific body region such as the knee, shoulder and head and neck may assist in increasing sideline management preparation for the team medical personnel. Musculoskeletal injuries can result in socioeconomic impacts such as career limitations, increased medical costs and loss of income to the injured player [11]. Former sports participants are more likely to be hospitalized for musculoskeletal disorders. Sports injuries have significant negative side-effects for the sports participant, the sports team and society at large in both the short and long term [16].

Therefore, the aim of this study was to provide analyses of knee, shoulder and head and neck body sites by soft tissue and fracture-dislocation injury types to enable a greater understanding of the nature of injuries most likely to be seen by sports medical personnel dealing with rugby league players.

Methods

Utilising a retrospective descriptive epidemiological approach this study provides a level 2c body of evidence [13]. There is no reliable data capturing system for injuries in rugby league through the national sports organisation. New Zealand's national taxpayer funded no-fault injury compensation system, administered by the Accident Compensation Corporation (ACC), was utilised to provide detailed descriptive epidemiological data including costs associated with treatment for injuries that occur in rugby league activities. Details of this government taxpayer-funded monopoly that provides a 24 hr no-fault personal injury scheme are detailed

elsewhere [5]. The ACC database records the number of injury claims but is unable to report missed match and training time, hospitalization duration and level of participation.

ACC categorises the rugby league claims made as minor or moderate to serious claims (MSC) [5]. We focused on MSC claims that occurred between 1st July 1999 and the 30th June 2007 as a result of participating in rugby league activities. Rugby league injuries to the knee, shoulder and head and neck body sites were extracted as they accounted for over half of the total ACC MSC costs and number of claims for rugby league over the study period as identified by King et al. [10]. Head and neck sites included the face, cervical spine, eye, ear, and nose. A subset dataset was created for soft tissue and fracture-dislocation injuries to these body sites given they were the most frequent (91% of knee injury claims, 44% of shoulder injury claims and 38% head and neck injury claims) and costly injury types identified by King et al. [10].

Ethical consent for the research was obtained from the Auckland University of Technology Ethics Committee (AUTEC 08/30) and the ACC ethics committee. The study meets the ethical standards of the *International Journal of Sports Medicine* [7].

All data were analyzed with SPSS v.16.0 (SPSS Inc, Chicago, Illinois, USA). Injury rates were calculated as the number of injuries per 1,000 MSC rugby league injury entitlement claims [9] and reported as means and standard deviations with 95% confidence intervals (CI). The injury rates and patterns were compared between reporting years (df=7) using a chi-squared (χ^2) test with significance set at $p<0.01$. Injury incidence was not calculated for the study as rugby league participation rates were not available as part of the data analysis. All costs are reported in New Zealand Dollars (NZD$000).

Results

Injury numbers, rates, percentages and associated costs for head and neck, shoulder and knee injuries by total injuries, soft tissue injuries and fracture-dislocation injuries for 1st July 1999 to 30th June 2007 varied by reporting year (see Table 1). Head and neck soft tissue injury claims (χ^2=26) and costs (χ^2=263) and fracture-dislocation injury claims (χ^2=30) and costs (χ^2=279) significantly increased from 1999 to 2007. Shoulder soft tissue injury claims (χ^2=108) and costs (χ^2=783) and fracture-dislocation injury claims (χ^2=97) and costs (χ^2=1252) significantly increased from 1999 to 2007. Knee soft tissue injury claims (χ^2=259) and costs (χ^2=1359), significantly changed from 1999 to 2007. There was no significant difference in knee fracture-dislocation injury claims (χ^2=13, df=7, p=0.838) but there was a significant increase for knee fracture-dislocation injury costs (χ^2=160) from 1999 to 2007. The percentage changes for injury numbers and associated costs by previous year, and compared with the 1999 to 2000 reporting period, are in Table 2.

Discussion

The significant increases in claims and costs from 1999 to 2007 for head fractures and soft tissue injuries, shoulder fracture-dislocations and soft tissue injuries need to be addressed. Previous studies reporting severe cervical spinal cord injuries [1] have shown an increase in the number of injuries to the cervical spine as a result of multiple tacklers involved in the tackle situation in rugby league with the ball carrier more commonly injured than the tackler [1]. Although not the most common injury site in our study, the shoulder has been reported to be the most common injury site in some [11], but not all, [2] studies in rugby league. In a recent position statement on prevention of acute sports injuries [16] acute shoulder injuries were common in sports involving body contact. The increase in the rate of shoulder injuries reported in our study may be related to a change in tackling styles employed. No published studies to date have looked at the impact of the tackle on the shoulder through direct (fall or blow) or indirect (transmission) forces in any sporting code and therefore there is no evidence for the identification of risk factors associated with acute shoulder injuries [16]. The concern is that although the yearly number of injury claims for the shoulder tripled over the study period, the associated costs for shoulder injuries in rugby league was nearly quadruple for the same reporting period. This increase in costs may be reflective of the changes in severity of the injuries to the shoulder and the tackling styles employed.

The most common injuries to the shoulder in matches are acromioclavicular joint injuries (32%) and rotator cuff/shoulder impingement injuries (23%), but injuries resulting in dislocation or instability to the shoulder (14%) resulted in the greatest portion of missed matches [8]. Training injuries to the shoulder were similar with acromioclavicular joint injuries (60%) being the most common injuries reported.

The decrease in the rate of knee injuries may be related to tackling styles but there are no published studies reporting changes in tackling styles to enable further analysis to be completed. Considerations in determining the cause of knee injuries are shoe-surface friction with different forces produced by different shoe type's worn [16], different playing surface grass types and environmental conditions with more knee injuries being reported to occur with a high water evaporation and low rainfall [15].

The cost of knee soft tissue injury claims reflects the complexity of the knee as a joint. For example, costs associated with treatment for anterior cruciate ligament injuries over a five year period have been reported to average $10,940 ±8,914 per MSC [6]. Other knee ligament costs were less, averaging $9,346 ±6,214 per injury claim. The mean cost per injury claim for knee soft tissue injury claims ($6,058) and knee fracture-dislocations ($6,466) were lower in our study. Although the mean and total costs of rugby league injuries have been previously reported [10], the exploration of injuries by injury sites is useful for medical personnel. Knowledge of the most costly or frequently injured body sites as a result of rugby league activities enables forward planning in terms of injury prevention or injury management. Medical services such as hospitals, physiotherapists etc. can prepare to plan for the required medical equipment and personnel to assist in the management of these injuries. Despite a growing knowledge base of injuries that occur from rugby league activities, there is a paucity of research specifically reporting the costs associated with rugby league participation which would further support

injury prevention program implementation and possible rule modification for a reduction of injuries in rugby league.

The changes in the costs and number of injury claims may be reflective of the changing style of match play seen in rugby league. Dominance of the tackle contest, the ability to tolerate physical collisions that occur in the tackle and tackling ability is important for success in rugby league [4]. Changes in defensive strategies at the professional level of participation showed that by increasing the number of defenders in the tackle the play-the-ball was slowed down [4]. This change in defence saw more players involved in tackling the opposition players, tackling around the shoulder area to stop the offloading of the ball and more effort in stopping the forward motion of the ball carrier with the aim to dominant the tackle and slow down the play-the-ball. As a result of the success of this style of defensive strategy other teams in the competition, and in other competitions, endeavoured to emulate the defensive strategies employed [4]. This may be reflective in the amateur rugby league injuries reported in this, and a previous study, [10] by the increase in injuries to the head and neck. It is suggested that medical personnel should focus their injury prevention efforts on increasing awareness of correct tackling technique, head injury awareness and management of suspected cervical spine injuries. The findings of our study should not been seen as being reflective of the total injury incidence for head and neck, shoulder and knee body sites from rugby league participation in New Zealand. As a result of the only recording mechanism for rugby league injuries in New Zealand being through the lodgement of injury claims through ACC [10], bias in the results could not be excluded as the data excludes injuries of rugby league participants that do not make injury entitlement claims [12]. The findings do highlight the reported costs and number of injuries over the study period of those injuries severe enough to require medical assistance and further rehabilitation. As there were no match or training related data available, further analyses could not be undertaken to identify costs and number of injury entitlement claims with respect to match and training exposure time. There was also no way to identify if the reported injury claims were due to an exacerbation of a previous injury from rugby league participation that did not meet the MSC criteria.

Another consideration is how anthropometric and physiological profiles may affect injury. There are currently no published studies on amateur rugby league anthropometric and physiological profiles in New Zealand. Further studies with specific details on injury mechanisms, physical characteristics of players and participation data are warranted to further explore the incidence of injury that occur from rugby league participation in New Zealand to enable injury prevention strategies to be developed in regards to injuries to the head and neck, shoulder and knee. Longitudinal studies are also warranted to further establish the incidence of rugby league injury sites by injury types to enable a broader understanding of the injuries that occur from rugby league participation.

Limitations

There are several identified limitations to this study. Although the data were accessed from the New Zealand ACC database we were unable to identify:

1. the environment that the injury occurred in nor the role the injured person was undertaking (tackler vs. ball carrier) when the injury occurred;
2. whether any of the injuries to the head and neck resulted in catastrophic or life changing situations (e.g. post-concussion syndrome, tetraplegia) as a result of rugby league activities;
3. the types of injuries (ligament strains, cruciate ligament ruptures, dislocations etc.) that occurred which may vary depending upon the number and associated costs per injury entitlement claim;
4. training and match activities so no comparison could be undertaken to identify if the increase in injury was match or training related;
5. how the injuries to the body sites occurred, what participation level the injuries occurred at, whether the injuries occurred as a result of match or training activities or at what stage of the match or training environment the injuries occurred.

Conclusion

From 1999 to 2007 there were significant increases in claims and costs for head fractures and soft tissue injuries and shoulder fracture-dislocations and soft tissue injuries, but significant decreases in knee soft tissue injury claims. Sports medical personnel dealing with rugby league players should focus their injury prevention strategies on reducing musculoskeletal injuries to the head and shoulder. It is suggested that there should be a focus on increasing awareness of correct tackling technique, head injury awareness and management of suspected cervical spine injuries.

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Table 1: Number, rate, 95% confidence interval and total and mean costs (NZD$000) and percentages of head and neck, shoulder and knee injuries by total, soft tissue and fracture-dislocation injuries for 1st July 1999 to 30th June 2007.

	Total injury				Soft tissue injury				Fracture-dislocations			
Yr	No	Rate *(95% CI)* %[a]	$000 *(%)*[b]	Mean $	No	Rate *(95% CI)* %[c]	$000 *(%)*[d]	Mean $	No	Rate *(95% CI)* %[e]	$000 *(%)*[f]	Mean $
Head/Neck												
99-00	51	81.3 *(61.8 to 107.0)* 1.8	889 *(2.1)*	17,431	18	28.7 *(18.1 to 45.6)* 0.6	107 *(0.6)*	5,944	19	30.3 *(19.3 to 47.5)* 0.7	92 *(0.5)*	4,842
00-01	44	81.6 *(60.7 to 109.7)* 1.5	873 *(2.0)*	19,841	20	37.1 *(23.9 to 57.5)* 0.7	110 *(0.6)*	5,500	17	31.5 *(19.6 to 50.7)* 0.6	97 *(0.6)*	5,706
01-02	52	103.4 *(78.8 to 135.7)* 1.8	1053 *(2.5)*	20,250	15	29.8 *(18.0 to 49.5)* 0.5	91 *(0.5)*	6,067	16	31.8 *(19.5 to 51.9)* 0.6	107 *(0.6)*	6,688
02-03	45	92.8 *(69.3 to 124.3)* 1.5	935 *(2.2)*	20,778	19	39.2 *(25.0 to 61.4)* 0.7	113 *(0.7)*	5,947	22	45.4 *(29.9 to 68.9)* 0.8	148 *(0.9)*	6,727
03-04	70	113.3 *(89.6 to 143.2)* 2.4	990 *(2.3)*	14,143	29	46.9 *(32.6 to 67.5)* 1.0	174 *(1.0)*	6,000	33	53.4 *(38.0 to 75.1)* 1.3	190 *(1.1)*	5,758
04-05	93	98.5 *(80.4 to 120.7)* 3.2	1,119 *(2.6)*	12,032	34	36.0 *(25.7 to 50.4)* 1.2	180 *(1.0)*	5,294	45	47.7 *(35.6 to 63.8)* 1.7	242 *(1.4)*	5,378
05-06	92	86.5 *(70.6 to 106.2)* 3.2	1,503 *(3.5)*	16,337	34	32.0 *(22.9 to 44.8)* 1.2	209 *(1.2)*	8,708	37	34.8 *(25.2 to 48.0)* 1.4	242 *(1.4)*	6,541
06-07	118	101.5 *(84.8 to 121.6)* 4.1	1,952 *(4.6)*	16,542	44	37.9 *(28.2 to 50.9)* 1.6	327 *(1.9)*	7,432	37	31.8 *(23.1 to 43.9)* 1.4	327 *(1.9)*	8,838
Total	565	95.1 *(87.6 to 103.3)* 19.4	9,314 *(21.8)*	16,485	213	35.9 *(31.3 to 41.0)* 7.6	1,311 *(7.6)*	6,150	226	38.0 *(33.4 to 43.3)* 8.6	1,445 *(8.6)*	6,469
Shoulder												
99-00	95	151.5 *(123.9 to 185.3)* 3.3	622 *(1.5)*	6,547	38	60.6 *(44.1 to 83.3)* 1.3	225 *(1.3)*	5,921	55	87.7 *(67.3 to 114.3)* 2.1	265 *(1.6)*	4,818
00-01	79	146.6 *(117.6 to 182.7)* 2.7	450 *(1.1)*	5,696	30	55.7 *(38.9 to 79.6)* 1.1	166 *(1.0)*	5,533	43	79.8 *(59.2 to 107.6)* 1.6	247 *(1.5)*	5,744
01-02	85	169.0 *(136.6 to 209.0)* 2.9	481 *(1.1)*	5,659	38	75.5 *(55.0 to 103.8)* 1.3	231 *(1.3)*	6,079	39	77.5 *(56.6 to 106.1)* 1.5	260 *(1.5)*	6,667
02-03	75	154.6 *(123.3 to 193.9)* 2.6	559 *(1.3)*	7,453	31	63.9 *(45.0 to 90.9)* 1.1	185 *(1.1)*	5,968	42	86.6 *(64.0 to 117.2)* 1.6	283 *(1.7)*	6,738
03-04	101	163.4 *(134.5 to 198.6)* 3.5	555 *(1.3)*	5,495	38	61.5 *(44.7 to 84.5)* 1.3	228 *(1.3)*	6,000	59	95.5 *(74.0 to 123.2)* 2.3	339 *(2.0)*	5,746
04-05	156	165.3 *(141.3 to 193.3)* 5.4	817 *(1.9)*	5,237	70	74.2 *(58.7 to 93.7)* 2.5	370 *(2.1)*	5,286	82	86.9 *(70.0 to 107.9)* 3.1	441 *(2.6)*	5,378
05-06	196	184.4 *(160.3 to 212.1)* 6.7	1228 *(2.9)*	6,265	81	76.2 *(61.3 to 94.7)* 2.9	497 *(2.9)*	6,136	109	102.5 *(85.0 to 123.7)* 4.2	712 *(4.2)*	6,532
06-07	219	188.5 *(165.1 to 215.2)* 7.5	2144 *(5.0)*	9,790	96	82.6 *(67.6 to 100.9)* 3.4	714 *(4.1)*	7,438	117	100.7 *(84.0 to 120.7)* 4.5	1,033 *(6.1)*	8,829
Total	1006	169.3 *(159.2 to 180.1)* 34.6	6,856 *(16.0)*	6,815	422	71.0 *(64.6 to 78.1)* 15.0	2,516 *(14.5)*	5,960	546	91.9 *(84.5 to 99.9)* 20.9	3,580 *(20.9)*	6,469
Knee												
99-00	161	256.8 *(220.0 to 299.7)* 5.5	868 *(2.0)*	5,391	142	226.5 *(192.1 to 267.0)* 5.0	842 *(4.9)*	5,930	17	27.1 *(16.9 to 43.6)* 0.6	82 *(0.5)*	4,824
00-01	146	270.9 *(230.3 to 318.6)* 5.0	740 *(1.7)*	5,068	132	244.9 *(206.5 to 290.5)* 4.7	729 *(4.2)*	5,523	14	26.0 *(15.4 to 43.9)* 0.5	80 *(0.5)*	5,714
01-02	122	242.5 *(203.1 to 289.6)* 4.2	654 *(1.5)*	5,361	117	232.6 *(194.1 to 278.8)* 4.2	607 *(3.5)*	5,188	7	13.9 *(6.6 to 29.2)* 0.3	47 *(0.3)*	6,714
02-03	100	206.2 *(169.5 to 250.8)* 3.4	563 *(1.3)*	5,630	93	191.8 *(156.5 to 235.0)* 3.3	555 *(3.2)*	5,968	8	16.5 *(8.2 to 33.0)* 0.3	54 *(0.3)*	6,750
03-04	114	184.5 *(153.5 to 221.6)* 3.9	692 *(1.6)*	6,070	100	161.8 *(133.0 to 196.8)* 3.5	600 *(3.5)*	6,000	13	21.0 *(12.2 to 36.2)* 0.5	75 *(0.4)*	5,769
04-05	193	204.4 *(177.5 to 235.4)* 6.6	1,260 *(2.9)*	6,528	174	184.3 *(158.9 to 213.8)* 6.2	919 *(5.3)*	5,282	18	19.1 *(12.0 to 30.3)* 0.7	97 *(0.6)*	5,389
05-06	240	225.8 *(198.9 to 256.2)* 8.3	1,555 *(3.6)*	6,479	218	205.1 *(179.6 to 234.2)* 7.7	1,338 *(7.7)*	6,138	17	16.0 *(9.9 to 25.7)* 0.6	111 *(0.7)*	6,529
06-07	262	225.5 *(199.8 to 254.5)* 9.0	2,418 *(5.6)*	9,229	236	203.1 *(178.8 to 230.7)* 8.4	1,755 *(10.1)*	7,436	22	18.9 *(12.5 to 28.8)* 0.8	194 *(1.1)*	8,818
Total	1338	225.2 *(213.5 to 237.6)* 46.0	8,750 *(20.4)*	6,540	1,212	204.0 *(192.8 to 215.8)* 43.0	7,345 *(42.4)*	6,058	116	19.5 *(16.3 to 23.4)* 4.4	740 *(4.4)*	6,466

Rates are per 1,000 MSC rugby league injury claims. Total is the sum of all eight years under study. CI: Confidence interval. Percentage of (a) = total number of injury entitlement claims; (b) = total injury entitlement costs; (c) total number of soft tissue injury entitlement claims; (d) = total amount of soft tissue injury entitlement costs; (e) total number of fracture-dislocation injury entitlement claims; (f) = total amount of fracture-dislocation injury entitlement costs.

Table 2: Percentage change from previous year, and from the 1999-2000 period, by number and total costs (NZD$000) for head and neck, shoulder and knee injuries by total, soft tissue and fracture-dislocation injuries for 1st July 1999 to 30th June 2007.

	Percentage change observed											
	Total Injury				Soft Tissue Injury				Fracture-Dislocations			
	Number		$000		Number		$000		Number		$000	
Yr	Previous	99-00	Previous	99-00	Previous	99-00	Previous	99-00	Previous	99-00	Previous	99-00
Head/Neck												
00-01	-13.7	-13.7	-1.8	-1.8	11.1	11.1	2.8	2.8	-10.5	-10.5	5.4	5.4
01-02	18.2	2.0	20.6	18.5	-25.0	-16.7	-17.3	-15.0	-5.9	-15.8	10.3	16.3
02-03	-13.5	-11.8	-11.2	5.2	26.7	5.6	24.2	5.6	37.5	15.8	38.3	60.9
03-04	55.6	37.3	5.9	11.4	52.6	61.1	54.0	62.6	50.0	73.7	28.4	106.5
04-05	32.9	82.4	13.0	25.9	17.2	88.9	3.5	68.2	36.4	136.8	27.4	163.0
05-06	-1.1	80.4	34.3	69.1	0.0	88.9	16.1	95.3	-17.8	94.7	0.0	163.0
06-07	28.3	131.4	29.9	119.6	29.4	144.4	56.5	205.6	0.0	94.7	35.1	255.4
Shoulder												
00-01	-16.8	-16.8	-27.7	-27.7	-21.1	-21.1	-26.2	-26.2	-21.8	-21.8	-6.8	-6.8
01-02	7.6	-10.5	6.9	-22.7	26.7	0.0	39.2	2.7	-9.3	-29.1	5.3	-1.9
02-03	-11.8	-21.1	16.2	-10.1	-18.4	-18.4	-19.9	-17.8	7.7	-23.6	8.9	6.8
03-04	34.7	6.3	-0.7	-10.8	22.6	0.0	23.2	1.3	40.5	7.3	19.8	27.9
04-05	54.5	64.2	47.2	31.4	84.2	84.2	62.3	64.4	39.0	49.1	30.1	66.4
05-06	25.6	106.3	50.3	97.4	15.7	113.2	34.3	120.9	32.9	98.2	61.5	168.7
06-07	11.7	130.5	74.6	244.7	18.5	152.6	43.7	217.3	7.3	112.7	45.1	289.8
Knee												
00-01	-9.3	-9.3	-14.8	-14.8	-7.0	-7.0	-13.4	-13.4	-17.7	-17.7	-2.4	-2.4
01-02	-16.4	-24.2	-11.6	-24.7	-11.4	-17.6	-16.7	-27.9	-50.0	-58.8	-41.3	-42.7
02-03	-18.0	-37.9	-13.9	-35.1	-20.5	-34.5	-8.6	-34.1	14.3	-52.9	14.9	-34.2
03-04	14.0	-29.2	22.9	-20.3	7.5	-29.6	8.1	-28.7	62.5	-23.5	38.9	-8.5
04-05	69.3	19.9	82.1	45.2	74.0	22.5	53.2	9.1	38.5	5.9	29.3	18.3
05-06	24.4	49.1	23.4	79.2	25.3	53.5	45.6	58.9	-5.6	0.0	14.4	35.4
06-07	9.2	62.7	55.5	178.6	8.3	66.2	31.2	108.4	29.4	29.4	74.8	136.6