An analysis of national variance in coding for patellofemoral instability

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**1. Introduction**

The incidence of patellofemoral instability (PFI) ranges between 5.8 – 23.2 per 100,000 [1, 2]. It is a common presentation to emergency departments, trauma clinics and elective knee clinics accounting for approximately 2-3% of knee injuries [3]. Most of the evidence base guiding management is based on level IV and V studies [4]. The most common surgical management is isolated medial patellofemoral ligament (MPFL) reconstruction or a combination of MPFL reconstruction, tibial tuberosity realignment and trochleoplasty [5]. All have demonstrated considerable success. In studies of patients who underwent isolated MPFL reconstruction, the re-dislocation rate was only 4.5% at a mean follow-up of 3.2 years and in another study, the success rate of MPFL reconstruction was 72% [6, 7]. In a study of patients who underwent tibial tubercle realignment at a mean follow-up of 6.2 years, 72.5% of operated knees demonstrated good to excellent results according to the Lysholm and Karlsson scores [8]. In a systematic review of patients who underwent trochleoplasty there was a significant improvement in pre- to post-operative Kujala (61.4 to 80.8) and Lysholm scores (55.5 to 78.5) [9]. Non-operative management includes vastus medialis obliquus reconditioning, patellar taping and stabilization braces [10]. However, a systematic review comparing surgical versus non-surgical interventions for treating patellar dislocation showed patients managed surgically had significantly lower risks of recurrent dislocation [11].

Due to the inconsistency of assessment and management, the British Patellofemoral Society (BPFS) Working Group prioritised PFI as a focus of research with a view to standardising practice. As part of their approach, they sought to understand the epidemiology and management by different trusts. The National Institute for Health and Care Excellence (NICE) guidelines specify which codes should be used to describe disease conditions and treatment. An International Statistical Classification of Diseases and Related Health Problems, version 10 (ICD-10) code is utilised by the World Health Organisation [12] to code diseases. Treatments are allocated an Office of Population Censuses and Surveys Classification of Surgical Operations and Procedures, 4th revision (OPCS-4) code [13]. Following a new diagnosis or delivery of a treatment these codes are assigned to patients by the coding department of NHS trusts. This serves to facilitate accurate data collection on diagnoses and treatments delivered. This information is also collected centrally and used to direct funding of procedures.

Although there are national guidelines as to which codes should be used to describe each condition and treatment, some of these are less specific than others, leaving room for interpretation. By identifying which specific set of codes are used in each trust with regards to the documentation of the management of PFI, the overarching purpose of this work would be to easily identify the relevant patients in each hospital, to study the epidemiology of the condition in the UK.

The Freedom of Information Act 2000 and the Freedom of Information Act (Scotland) 2002 [14, 15] enable the public to obtain specifically defined information from any of the government bodies or departments (including the NHS) in the UK. Once a request has been received and understood, the organisation has 20 days in which to provide their response [16]. We sought to utilise the FOI to gain the information we required, thus making it a potentially valuable research tool when seeking to answer questions regarding epidemiology and NHS practice. The aim of the study was to identify which specific set of codes are used by each trust to document the diagnosis and management of PFI.

**2.** **Materials and Methods**

Every NHS trust in England (n=226) was identified using the NHS service directory and their Freedom of Information (FOI) department email documented. Trusts in Scotland, Wales and Northern Ireland were not included in this study. Trusts that managed mental health exclusively and specialist centres for non MSK services were excluded. Trusts that did not include trauma units were initially approached in order to capture presentations to minor injuries units and community physiotherapy that may have been referred from primary care. However, they responded to state that they did not hold this information and were subsequently excluded.

Each Trust was emailed between 19/02/20 – 16/03/20 and asked to provide information regarding their use of International Statistical Classification of Diseases and Related Health Problems version 10 (ICD-10) codes for diagnoses related to PFI, and Office of Population Censuses and Surveys Classification of Surgical Operations and Procedures 4th revision (OPCS-4) codes for surgical management of PFI. Reminder emails were sent to those who did not respond within the required 20 days as per the FOI guide [16]. The responses were collated in Microsoft Excel (2016) (Albuquerque, New Mexico, United States of America) listing both the trust’s FOI contact details and the codes that that trust associated with each of the diagnoses and treatments as listed in **(table 1).**

**3.** **Results**

One hundred and thirty-two acute Trusts were approached via email or submission of an online form through the trust website and 106 Trusts responded with codes. Some of these breeched the 20-day window as dictated by the FOI act, however allowances were made as the end of the 20-day period coincided with the onset of the United Kingdom national COVID-19 response and lockdown on the 23rd of March 2020. The overall response rate for the provision of codes from acute trusts managing patients with PFI was 80%. Two trusts simply directed us to the national ICD-10 guidelines implying that those were the codes they use.

All but 4/106 (3.8%) trusts used S830 consistently as a diagnostic code for patellar dislocation and M220 for recurrent dislocation. Patellar instability had much greater variance in codes **(table 2)**.We identified 10 different codes being used by the trusts who responded, with the most common one, M235 being used by 36/106 (34.0%). Codes were allocated by trusts to the description that fitted best, and this could include recurrent subluxation (M221), patellofemoral disorders (M222), other derangement of the patella (M223), other disorders of the patella (M228) or unspecified disorder of patella (M229). ‘N/A’ was used to denote the response of a trust who responded that they do not have specific codes for the diagnoses of PFI.

The codes used by Trusts to describe the different surgical management options **(tables 3.1-3.8)** displayed even greater variability than the codes used for the diagnoses. The number of different codes used by trusts for each surgical procedure ranged from 11 in the procedures: lateral release, medial patellofemoral ligament (MPFL) reconstruction, tibial tubercle osteotomy and Elmslie-Trillat to 19 in proximal realignment. The coding for a lateral release showed the most uniformity (64%) and Maquet osteotomies the least (34%). ‘N/A’ was used to denote the response of trusts who responded that they do not have specific codes or do not perform the treatment for PFI.

Furthermore, a large number of trusts used multiple codes for a diagnosis or treatment of PFI. There were only 3/106 (2.8%) trusts that used multiple codes for patellar dislocation and recurrent patellar dislocation, however 19/106 (17.9%) trusts for the diagnosis of patellar instability **~~(figure 1)~~**. There was an even greater number of trusts that used multiple codes for the treatment of PFI ranging from 40/106 (37.7%) in proximal realignment to 72/106 (67.9%) in Maquet osteotomy **~~(figure 2)~~**.

**4.** **Discussion**

Difficulties with accurate coding is not unique to orthopaedic surgery and has huge financial implications [17]. In a study of clinical coding accuracy in 30,127 patients at least one coding change occurred in 15,402 (51%) of patients, resulting in income variance of £3,974,544 (+6.2%) [18]. In a multidisciplinary audit of neurosurgical clinical coding accuracy on 386 patients, at least one coding error was found in 71 (18.4%) of patients, this financially translated to £111 revenue-loss per patient episode and projected to annual department losses of £171,452 [19]. This issue is international with coding errors found in 89.4% (415/424) of patient medical records in a study in Malaysia [20].

The study found that there was a discrepancy in which codes trusts use for the diagnosis and treatment of PFI and that PFI does not carry its own descriptive code under the ICD-10 guide. One of the reasons for the multitude of different codes for the same procedure may be because currently we have no good code for the procedure so Trusts are interpreting the procedure within the framework of pre-existing codes. For example in the coding of MPFL reconstruction, 40 trusts used W743 which denotes reconstruction of extra-articular ligament, 35 trusts used O271 (reconstruction of extra-articular ligament for stabilisation of joint) and 14 trusts used W742 (reconstruction of intra-articular ligament).

This confirms the need for coding to keep up with surgical procedures. The current variety in coding across the UK makes it difficult to identify relevant patients in a given hospital, with current codes also used for a variety of other knee pathologies.

National coding needs standardisation. There is also clearly a misunderstanding on the part of the coders when it comes to certain operations. For example, one of the trusts that had been coding for MPFL reconstruction as an intra-articular ligament reconstruction sought clarity from their orthopaedic department to confirm and have since adjusted their coding system to record this more accurately as an extra-articular ligament reconstruction.

Although the results tell us how the coders in each trust allocate ICD-10 and OPSC-4 codes, they do not tell us how surgeons document their cases and in turn, how that is interpreted by the coding department. However, in a study evaluating the accuracy of administrative coding used in total hip and knee arthroplasty, ICD-9CM and ICD-10CM had an accuracy of 96% and 95% respectively [21].

Furthermore, it is clear that in many trusts, there are multiple codes that can be used to describe the same procedure which will further complicate data collection. The trusts identified in this work were limited to those in England and although these make up the vast majority of UK trusts, further work would include submitting the same request to trusts in Scotland, Wales and Northern Ireland.

Without clear standardised national coding it will make it extremely challenging to accurately identify patient group populations for research and thus impinge on our ability to understand the epidemiology of this condition better.

**5.** **Conclusion**

There is a lack of uniformity in coding PFI diagnosis and treatment, which needs standardisation. This will enable further research to better understand the epidemiology of this condition and improve future treatment for patients with this disabling problem.

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~~Figure 1: Graph showing the number of trusts that used multiple codes for the diagnosis of~~ **~~patellofemoral~~** ~~instability~~

~~Figure 2: Graph showing the number of trusts that used multiple codes for the treatment of~~ **~~patellofemoral~~** ~~instability~~

Table 1: List of diagnoses and treatments of PFI that each trust was approached to provide information on with regards to the code they use to document them

Table 2: List of different codes and number of trusts which use those codes for **patellofemoral** instability diagnoses

~~Table 3: List of different codes and number of trusts which use those codes for 1-4/8~~ **~~patellofemoral~~** ~~instability treatments~~

~~Table 4: List of different codes and number of trusts which use those codes for 5-8/8~~ **~~patellofemoral~~** ~~instability treatments~~

**Table 3.1 Codes for Lateral release and number of trusts that use that code**

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**Table 3.8 Codes for Trochleoplasty and number of trusts that use that code**

Table 1: List of diagnoses and treatments of PFI that each trust was approached to provide information on with regards to the code they use to document them

|  |  |
| --- | --- |
| Diagnoses | Treatments |
| Patellar dislocation | Lateral release |
| Recurrent patellar dislocation | Medial patello-femoral ligament (MPFL) reconstruction |
| Patellar instability | Proximal realignment |
|  | Allograft (at the time of MPFL reconstruction) |
|  | Tibial tubercle osteotomy |
|  | Elmslie Trillat procedure |
|  | Maquet osteotomy |
|  | Trochleoplasty |

Table 2: List of different codes and number of trusts which use those codes for **patellofemoral** instability diagnoses

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Diagnoses of **patellofemoral** instability | | | | | |
| Patellar dislocation | Number of trusts | Recurrent patellar dislocation | Number of trusts | Patellar instability | Number of trusts |
| M2436 | 1 | M220 | 102 | M221 | 2 |
| S283 | 1 | M221 | 1 | M222 | 5 |
| S830 | 102 | M222 | 1 | M223 | 17 |
| W775 | 1 | M240 | 1 | M228 | 26 |
| N/A | 1 | N/A | 1 | M235 | 36 |
|  |  |  |  | M2359 | 1 |
|  |  |  |  | M236 | 1 |
|  |  |  |  | M253 | 2 |
|  |  |  |  | M2536 | 14 |
|  |  |  |  | Q741 | 1 |
|  |  |  |  | N/A | 1 |

~~Table 3: List of different codes and number of trusts which use those codes for 1-4/8~~ **~~patellofemoral~~** ~~instability treatments~~

~~Table 4: List of different codes and number of trusts which use those codes for 5-8/8~~ **~~patellofemoral~~** ~~instability treatments~~

**Table 3.1 Codes for Lateral release and number of trusts that use that code**

| Lateral release | Number of trusts |
| --- | --- |
| W788 | 1 |
| W791 | 1 |
| W818 | 1 |
| W844 | 1 |
| W718 | 1 |
| W858 | 2 |
| W848 | 2 |
| T748 | 2 |
| W778 | 7 |
| N/A | 9 |
| W784 | 11 |
| W783 | 68 |

**Table 3.2 Codes for MPFL reconstruction and number of trusts that use that code**

|  |  |
| --- | --- |
| MPFL reconstruction | Number of trusts |
| W72- | 1 |
| W731 | 1 |
| W74- | 1 |
| W772 | 1 |
| W778 | 1 |
| W841 | 1 |
| W77- | 2 |
| W776 | 2 |
| N/A | 7 |
| W742 | 14 |
| O271 | 35 |
| W743 | 40 |

**Table 3.3 Codes for Proximal realignment and number of trusts that use that code**

|  |  |
| --- | --- |
| Proximal realignment | Number of trusts |
| T649 | 1 |
| T705 | 1 |
| W168 | 1 |
| W669 | 1 |
| W742 | 1 |
| W777 | 1 |
| W784 | 1 |
| W818 | 1 |
| X231 | 1 |
| T644 | 2 |
| T792 | 2 |
| W768 | 2 |
| W77- | 2 |
| O271 | 3 |
| T64- | 3 |
| W771 | 4 |
| W775 | 8 |
| W772 | 9 |
| W778 | 17 |
| N/A | 45 |

**Table 3.4 Codes for allograft and number of trusts that use that code**

|  |  |
| --- | --- |
| Allograft (at the time of MPFL reconstruction) | Number of trusts |
| W726 | 1 |
| W772 | 1 |
| W775 | 1 |
| W778 | 1 |
| W841 | 1 |
| Y011 | 1 |
| Y016 | 1 |
| Y271 | 1 |
| O271 | 2 |
| W72- | 2 |
| W742 | 3 |
| W743 | 5 |
| Y658 | 5 |
| N/A | 15 |
| W322 | 16 |
| Y272 | 50 |

**Table 3.5 Codes for Tibial tubercle osteotomy and number of trusts that use that code**

|  |  |
| --- | --- |
| Tibial tubercle osteotomy | Number of trusts |
| W069 | 1 |
| W777 | 1 |
| Z774 | 1 |
| W081 | 2 |
| W122 | 2 |
| T703 | 3 |
| W132 | 3 |
| W164 | 5 |
| W772 | 9 |
| W169 | 12 |
| N/A | 16 |
| W775 | 51 |

**Table 3.6 Codes for Elmslie Trillat procedure and number of trusts that use that code**

|  |  |
| --- | --- |
| Elmslie | Number of trusts |
| T772 | 1 |
| W069 | 1 |
| W777 | 1 |
| Z774 | 1 |
| W122 | 2 |
| W132 | 2 |
| W164 | 3 |
| T703 | 6 |
| W169 | 9 |
| N/A | 17 |
| W772 | 25 |
| W775 | 38 |

**Table 3.7 Codes for Maquet osteotomy and number of trusts that use that code**

|  |  |
| --- | --- |
| Maquet | Number of trusts |
| T702 | 1 |
| W069 | 1 |
| W777 | 1 |
| W778 | 1 |
| Z774 | 1 |
| W132 | 2 |
| W122 | 3 |
| W164 | 3 |
| W772 | 5 |
| W169 | 9 |
| N/A | 13 |
| T703 | 30 |
| W775 | 36 |

**Table 3.8 Codes for Trochleoplasty and number of trusts that use that code**

|  |  |
| --- | --- |
| Trochleoplasty | Number of trusts |
| O271 | 1 |
| W081 | 1 |
| W088 | 2 |
| W178 | 1 |
| W312 | 1 |
| W338 | 1 |
| W58 | 1 |
| W581 | 3 |
| W588 | 1 |
| W718 | 2 |
| W771 | 2 |
| W772 | 1 |
| W775 | 53 |
| W778 | 4 |
| W818 | 3 |
| W834 | 1 |
| W848 | 2 |
| W891 | 1 |
| N/A | 25 |