Austin Journal of Orthopedics & Rheumatology

Open Access

Austin Publishing Group

Research Article

Seasonal Variation and "Winter Bed Pressures" Leads to Reduced Operative Exposure for Higher Surgical Orthopaedic Trainees

Ajwani SH*, Barclay J and Ryan WG
The Royal Bolton Hospital NHS Foundation Trust, Minerva Road, Farnworth, Bolton

***Corresponding author:** Ajwani SH, Royal Bolton Hospital, Minerva Road, Farnworth, Bolton

Received: November 27, 2020; **Accepted:** December 15, 2020; **Published:** December 22, 2020

Abstract

Introduction: There is increased demand on health services during winter months. This variation in demand can affect training of orthopaedic trainees.

Methods: We assessed how the seasonal variation affected elective and trauma operating during the winter months, particularly during the NHS elective surgery winter embargo of 2017/8. Secondarily we aimed to determine how operative exposure is affected whilst progressing through a training programme.

Permissions were sought to undertake a review of trainees' logbooks from the elogbook and the SAC in T&O.

Results: A cohort of 38 trainees were retrospectively analysed. 5 trainees were excluded. A total of 33 trainees' operative exposure was analysed. 31,688 procedures were logged by the cohort. An average of 320 procedures were logged per year. The greatest drop in operating was found to be in the winter period with a total of 6805 operations (21% of total procedures). The average number of cases that trainees logged in the winter months was 68 operative procedures, this is compared to 82, 84, and 85 procedures in the summer, autumn and spring months. This difference was found to be statistically significant. We found no statistical difference between elective and trauma cases.

Conclusion: There is seasonal reduction in operative exposure that is experienced by trainees. The effect of winter pressures appears to reduce trauma and elective operating proportionately.

Keywords: Winter pressures; Seasonal variation; Operative exposure; Registrar/Resident; Training

Introduction

Many training related pressures are currently being experienced by UK higher surgical trainees in orthopaedics. These challenges include, shift pattern working, gaps in on call rotas, and the effects of increased demand on the NHS system [1-3]. One such challenge is the effect of increased demands in the winter on NHS services that have resulted in a ban on all elective orthopaedic surgery [4,5].

During 2017, one of the worst winters on record, the NHS was forced to cancel all elective operating to allow them to meet the demand for hospital beds during this time [4]. The stoppage of any operative activity has obvious effects on trainees who need to achieve on average 300 cases a year over the 6-year training programme [6]. It is a Speciality Advisory Committee (SAC) requirement for trainees in a UK orthopaedic training programme to obtain 1800 cases to get a certificate for Completion of Training (CCT) [6]. Growing pressures during the winter that can affect their ability to achieve this target could potentially result in trainees having to extend their training period in order to meet this criteria for surgical operating [7,8].

We aimed to determine the effects of seasonal variation on orthopaedic higher surgical trainees' exposure to operative procedures. We also wanted to determine how the seasonal variation affected elective and trauma operating during the winter months, particularly during the time when the NHS edict closed elective surgery for several weeks in the winter of 2017/2018, and adjacent years. A secondary outcome measure was to determine how operative exposure is affected whilst progressing through a training programme.

Materials and Methods

Study period and design

Permissions were sought to undertake a review of trainees' logbooks from the e-logbook and the UK SAC in T&O (Trauma and Orthopaedics) in order to determine the effects of seasonal variation on operative exposure for higher surgical trainees. Audit access to the pan-surgical e-logbook from the Royal college of surgeons of Edinburgh was permitted and data collection was undertaken. The study was designed as a retrospective logbook review over a 3 year period that encompassed periods of particularly high demand on NHS services and pressures on operative exposures for trainees. The codes used by the e-logbook were used to determine what is classified as a trauma or elective procedure.

Inclusion

Three training cohorts were examined. From the start date of August 2016, trainees in years ST3, ST4, ST5 and ST6 were followed

Citation: Ajwani SH, Barclay J and Ryan WG. Seasonal Variation and "Winter Bed Pressures" Leads to Reduced Operative Exposure for Higher Surgical Orthopaedic Trainees. Austin J Orthopade & Rheumatol. 2020; 7(3): 1094.

over a 3 year period until July 2019. More senior trainees would have left the training programme later in the study period, so data for these trainees would be incomplete.

Review of e-logbooks for trainees on the North West deanery orthopaedic rotation was undertaken, as this represents one of the largest orthopaedic training rotations in the United Kingdom and would be representative of general orthopaedic training and operative exposure. The types of jobs that trainees would undertake during their time on the rotation and the year of training is shown in Table 1.

Exclusion criteria

Trainee data were excluded if they had an extended period of absence of 2 months seen as a period where no operations were submitted when logbook reports were analysed. It was assumed that trainees took annual leave and short-term study leave to a similar degree across their jobs. We did not look at the patterns of work that trainees undertook in this period specifically, but the typical working pattern for most trainees on the northwest orthopaedic rotation is non-resident 24 hour on call. In two or three large units, shift pattern working is undertaken. We also did not look at the types of hospital that the trainees worked at, or if these sites operated a split site systems in which elective and trauma sites are separated. We only looked at trainees in years ST3-ST6 for the 3 year period as trainees senior to this would have left the training programme in the 3 year period and their operative training numbers outside of a regimented programme would not commonly be subject to the same rigorous scrutiny as whilst on a 6 year orthopaedic national training programme.

Statistical analysis

Data were collected and populated on to a Microsoft excel database (Microsoft Corp, Redmond, Washington, District of Columbia, USA). This programme was used to generate graphical representation of the data. The statistical analysis was performed using Stats Direct software (Stats Direct, Birkenhead, UK). The data was tested for normality using a Shapiro Wilk test. When the data was found to be parametric a two- way ANOVA test was utilised to determine any difference between groups. When not parametric a Freidman test was used or a Kruskal- Wallis test was used where appropriate. A value of $p < 0.05$ was deemed statistically significant.

Data were split according to seasons. Winter was defined as December, January and February; Spring as March, April and May; Summer as June, July and August; and Autumn as September, October and November.

Results

Demographics

A cohort of 38 trainees were retrospectively analysed. Five trainees were excluded from the analysis as they did not meet the inclusion criteria. This left a total of 33 trainees whose logbooks were analysed over a 3 year period from August 2016 to August 2019. This allowed for analysis of trainees progressing through years ST3 to ST5 and ST5 to ST8. There were 4 Female trainees and 29 male trainees.

The numbers in each group are shown in Table 2.

Over the 3 year period a total of 31688 procedures were logged on the RCS Edinburgh e-logbook database by the cohort of trainees we analysed. An average of 320 procedures were logged per year by the trainees. The numbers that were logged did vary considerably depending on the year of training that the trainees were progressing through as shown in Table 3. There was a statistically significant reduction in the total number of procedures that were logged by trainees in the ST6 year.

Table 1: Typical specialty training posts in the Manchester Deanery over 6 years of training.

Year of training	Subspecialty post
ST3	Joint Arthroplasty (Hip or Knee)
ST4	Shoulder and Elbow and Foot and Ankle
ST5	Arthroplasty (Hip or Knee) and Hands
ST6	Paediatrics and Spines
ST7	Remediation / Subspecialty post
ST8	Subspecialist Post

Table 2: Breakdown of the number of trainees in each year group at the start of the study in 2016.

Year in Training as of Aug 2016	Number in each year
ST3	13
ST4	6
ST5	9
ST6	5

Table 3: Table demonstrating the average number of cases performed by different grades of trainees over a 3 year period. The green boxes show years of training that meet the 300 cases per year threshold. The red boxes show years of training where operative numbers fell below the 300 case threshold (average number required per year to achieve minimum for CCT).

	16/17	17/18	18/19
ST3	354		
ST4	333	363	
ST5	367	333	345
ST6	187	210	140
ST7		308	320
ST8			330

Seasonal variation

There was a statistically significant variation in operative numbers between the seasons using a two-way ANOVA test $p<0.05$. The greatest drop in operating was found to be in the winter period (December to February) with a total of 6805 operations being logged during the winter months this represents 21% of the procedures logged over the study period. See Figure 1.

The average number of cases that trainees can expect to log per season during the winter is 68 operative procedures, this is compared to 82, 84, and 85 procedures in the summer, autumn and spring, seasons respectively. This difference was found to be statistically significant see Figure 2. In order to hit the 300 cases per year target trainees need to average 25 cases per month. Figure 3 shows that this is not achieved in the winter months and is also low in the month of July.

A subgroup analysis did not demonstrate any statistical difference between any winter season that was analysed during the study period

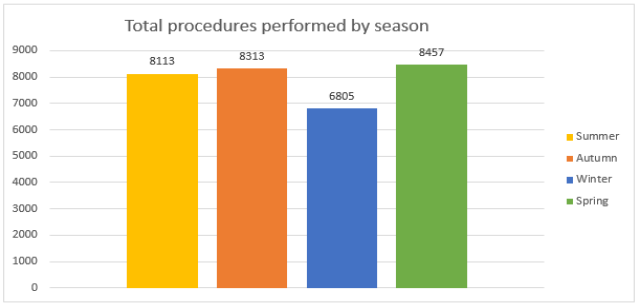

Figure 1: Seasonal variation in operative procedures.

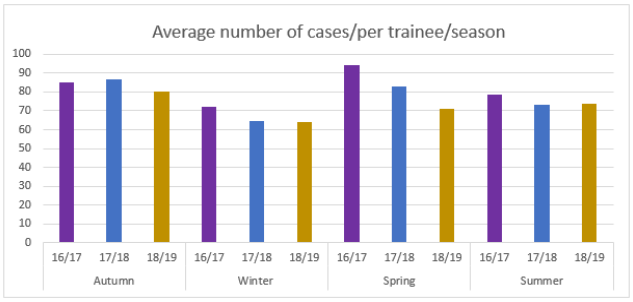

Figure 2: The average number of cases per trainee stratified by season over the study period.

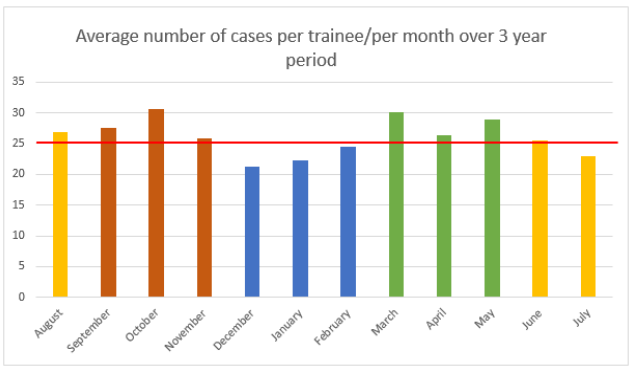

Figure 3: Average number of cases per month over the study period.

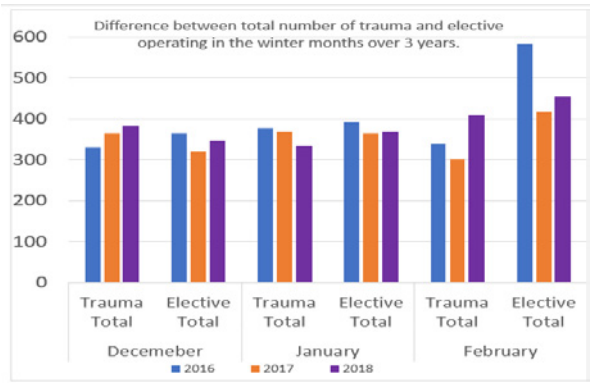

Figure 4: Graph of types of operations performed over the winter months stratified by year.

p=0.38. The graph in Figure 2 shows a consistent reduction in number of procedures during the study period in the winter period. The data, although not statistically significant suggests that overall operative numbers are affected in winter regardless of the specific period, with a persistent downward trend.

A further analysis was performed of the winter month subgroups of the 3 years. We found that there was no statistical difference between elective and trauma cases that were logged over the 3-year period. The data were analysed using a Friedman test with a p= 0.11. This appears to suggest that winter operating is mainly affected, and trauma and elective operating appears to be reduced proportionally see Figure 4.

Discussion

Our study has demonstrated that orthopaedic surgical trainees suffer from seasonal variation in the number of operative procedures performed. There is a statistically significant reduction in operating during the winter months. Furthermore, we found that there is no statistically significant difference in the types of procedures that are affected with both elective and trauma cases being impacted upon to a similar degree. This may be due to reduction in operating activity around the Christmas and new year period, and also due to the effect of increased demand on NHS services during the winter months [9].

Although there are numerous position statements from trainee bodies speculating on the impact of winter pressures on surgical training. Very little has been published that objectively tries to measure this impact numerically for orthopaedic trainees. The absolute reduction and the disparity of the effect on trauma and elective operating specifically has also not been previously assessed in the current orthopaedic training literature [10,11]. Recognising the effects of seasonal variation upon training can allow for strategies to be implemented to reduce its impact [12].

For trainees to hit the minimum 300 cases a year, they must on average log 25 cases per month. The total number of cases logged per month is less than this threshold value during the winter months and in July. We anecdotally feel that this could be due to the fact trainees and trainers tend to take annual leave around July. Training placement changeover for our region typically occurs in February and August. August change over does not seem to show a reduction in operative activity. However, February does fall below the 25 case threshold marginally but is actually higher than December and January which are particularly hit by reduction in operating activity. Suggesting that the reduction seen in February is not due to change over of jobs but due to a true seasonal variation in the NHS system.

Operative activity of trainees could be impacted upon due to seasonal variation in orthopaedic trauma requiring hospital admission or due to increased pressure on hospital beds from other medical admissions. In periods of increased demand trauma cases mandating inpatient hospital stay maybe prioritised above elective operative activity depending on bed capacity and hospital trust policies [10,11]. Several studies have demonstrated seasonal differences in orthopaedic trauma frequency. The influence of winter on hip fracture incidence is controversial with some studies suggesting increased hospital admissions during winter and others suggesting no surge during the colder months [13-15]. Winter months do have a

higher proportion of distal radius and ankle fractures compared to other seasons [13,16]. Conversely, the Summer months do see a spike in paediatric trauma cases [17].

There was no significant difference in the proportional reduction of operating activity when comparing the winters of 2016, 2017, and 2018. Although there was a trend towards reduced operative exposure from 2016-2018, these reductions were not statistically significant. This is of particular interest as during the 2017-2018 winter period, there was a UK government edict which mandated nationwide cancellation of elective activity across the NHS [4].

The results of our work also demonstrate that the trainees do not increase the number of procedures logged whilst progressing through a training programme. In our cohort, trainees rotate through most orthopaedic subspecialties during the 6 year training period. Traditionally, the Hand, Paediatric and Spinal rotations occur in years ST5 and ST6. Our study demonstrates a reduction in the total number of procedures that were logged by trainees in the ST6 year. This is likely due to the fact the trainees are in subspecialist posts that have lower operating volumes in these placements. Trainees that were in these posts on average had procedural numbers below the 300 procedures that they need a year for CCT requirements [6].

There are some limitations to our work. This was a review of trainees from a single region and this work could demonstrate single regional variation. However, the training programme is one of the largest in the country and the experiences of the trainees in this region are likely similar to other regions of the UK. We did not look at the types of procedures that were undertaken by trainees. It is likely that certain elective procedures that necessitate inpatient admission were disproportionally affected by the elective embargo that was put in place in winter 2017-2018. However, day case procedures that obviate the need for prolonged inpatient admission may well have been allowed to proceed.

Additionally, we did not look at the SAC indicative numbers to see if a trainee's ability to obtain these were affected by seasonal variation. We only reviewed total procedures in terms of elective and trauma cases as generated by the eLogbook.

An assumption was made that logbook data was complete and accurate for each trainee. We feel this is likely to be the case as it is obligatory to maintain accurate records while on a training programme, for ARCP assessment purposes. We also did not control for the types of job placements that trainees were undertaking while in the study period. It is possible that certain subspecialties may be affected more than others by seasonal variation. The type of post that trainees were in may also be subjected to different volumes of operating in highly specialised centres that may experience greater pressure on their beds when the NHS system is strained.

Although this work was undertaken at a single large training programme region, the basis of this study could be used to assess the impact of elective cancellations in the winter on a larger national scale for orthopaedic trainees.

Conclusion

The results of our work confirm that there is seasonal reduction in operative exposure that is experienced by orthopaedic higher surgical trainees during the Winter months. This has been the case annually for the last 3 years, irrespective of the enforcement of a government directive to stop elective surgery. The effect of winter pressures appears to affect elective and trauma cases to a similar degree. The results from our work objectively measure the seasonal variation and knowledge of this impact could help training programmes in the UK plan for this variation and help trainees to maximise training opportunities.

Acknowledgement

We would like to acknowledge and thank the patients that took part in this study.

References

1. Sevenoaks H, Ajwani S, Hujazi I, Sergeant J, Woodruff M, Barrie J, et al. Shift working reduces operative experience for trauma and orthopaedic higher surgical trainees: a UK multicentre study. Ann R Coll Surg Engl. 2019; 101: 197-202.
2. Rimmer A. Winter pressures: moving trainees to wards in crisis must not become "normalised," says HEE. BMJ. 2018; 363: k5225.
3. Wilkinson E. How to fix doctors' rotas. BMJ. 2019; 365: l4367.
4. Royal College of Surgeons of England. Over 62,000 fewer operations performed this winter, following necessary cancellations. 2018.
5. Royal College of Physicians and Surgeons of Glasgow. College warns of winter crisis impact on training 2019.
6. Joint Committee on Surgical Training. Certification Guidelines for Trauma & Orthopaedic Surgery. 2016.
7. British Orthopaedic Association. BOA statement on Training and Winter Pressures 2018.
8. Health Service Journal. 'Winter pressures' affecting progression of trainee surgeons 2018.
9. The Association of Surgeons in Training (ASiT). Winter Pressures affecting Surgeons in Training. 2018.
10. Koç T, Bowditch, M, Bucknall V. The Effects of 'Winter Pressures' on Trauma and Orthopaedic Training. Journal of Trauma & Orthopaedics. 2018; 6: 24-25.
11. Brown M. Winter Pressures and effects on training. Journal of Trauma & Orthopaedics. 2019; 7: 26.
12. Health Education England. Supporting winter pressures safely through managed education and training programmes.
13. Murray IR, Howie CR, Biant LC. Severe weather warnings predict fracture epidemics. Injury. 2011; 42: 687-90.
14. Matter-Walstra K, Widmer M, Busato A. Seasonal variation in orthopedic health services utilization in Switzerland: the impact of winter sport tourism. BMC Health Serv Res. 2006; 6: 25.
15. Yee DK, Fang C, Lau TW, Pun T, Wong TM, Leung F. Seasonal Variation in Hip Fracture Mortality. Geriatr Orthop Surg Rehabil. 2017; 8: 49-53.
16. Weston-Simons J, Jack CM, Doctor C, Brogan K, Reed D, Ricketts D. The impact of snow on orthopaedic trauma referrals. Injury, 2012; 43: 1033-1036.
17. Livingston KS, Miller PE, Lierhaus A, Matheney TH, Mahan ST. Does Weather Matter? The Effect of Weather Patterns and Temporal Factors on Pediatric Orthopedic Trauma Volume. Open Orthop J. 2016; 10: 550-558.