ISSN: 2832-7705

Research Article

International Journal of Clinical and Medical Education Research

Optimizing Orthopedic Operative Notes: A Closed-Loop Audit and Interventional Approach for Improved Practices

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Submitted: 2023, Nov 10; **Accepted**: 2023, Dec 26; **Published**: 2024, Feb 07

Citation: Burney, A., Jawed, S. Z., Fatima, L., Fatima, A., Sahito, B. (2024). Optimizing Orthopedic Operative Notes: A Closed-Loop Audit and Interventional Approach for Improved Practices. *Int J Clin Med Edu Res, 3*(2), 01-10.

Abstract

Maintaining accurate and clear medical records is crucial for effective patient care. These records, detailing a patient's evaluation, management plan, surgical procedures, and post-operative instructions facilitate a seamless communication and care during the initial postoperative phase. The Royal College of Surgeons issued Good Surgical Practices guidelines in 2008 and updated them in 2014, setting parameters for operative notes. This audit aimed to evaluate handwritten operative note-keeping practices in Orthopedic Unit I at Dr. Ruth K.M. Pfau Civil Hospital Karachi in comparison to these established guidelines.

The audit was conducted in two cycles between March and June 2023. In each cycle, 58 operative notes were evaluated against Good Surgical Practices (RCS) guidelines using a predefined form. After the initial audit, a meeting with the department team highlighted findings, stressed the importance of accurate operative notes, and introduced a new RCS-compliant format approved for implementation. Surgeons adapted to the new format during a 2-week period, followed by the second phase of the re-audit. The results were shared within the department to ensure ongoing improvement.

In the initial audit, compliance with the RCS guidelines was observed at 40.7%. After implementing the new note format, significant enhancements were noted in 20 out of 22 parameters, resulting in an overall compliance rate of 64.8% and an improvement of 24.1%. Significant improvements were observed in recording patient identification, prosthesis details, antibiotic prophylaxis, surgical complications, incision name, theater anesthetist's name, and anticipated blood loss. However, documentation of 'any additional procedures performed and the reason why' and 'DVT prophylaxis' showed minimal to no improvement.

The survey reveals notable gaps in orthopedic operative note documentation, emphasizing the limitations of traditional handwritten notes and a lack of adherence to operative notes guidelines. Rectifying this is crucial for optimal patient care, maintaining precise records, and minimizing legal risks.

Keywords: Royal College of Surgeons, Compliance to Guidelines, Record Keeping, Operative Notes, Clinical Audit, Improved Practices, Orthopedics, Quality Improvement.

Abbreviations

RCS – Royal College of Surgeons
GSP – Good Surgical Practices
DVT – Deep Vein Thrombosis

1. Introduction

Effective medical record keeping is a vital component of patient management. Medical records must be clear, accurate, and legible, as they contain crucial details about a patient's evaluation and management plan [1]. In surgical specialties, producing operative notes accurately is of utmost importance. These documents give a detailed account of the surgical procedure and findings. Moreover, they contain essential post-operative instructions and serve as a comprehensive data transfer tool among the members of the medical team; thus, playing an indispensable role in the continuity of care during the early post-operative period.

Operative notes are also pivotal in medico legal cases, where legible and proper notes can aid surgeons immensely. Studies have shown that up to 45% of operative notes are indefensible, emphasizing the need for detailed documentation. In the 2015 review of adult elective orthopedic services, titled "Getting it Right First Time," it was revealed that surgical specialties, particularly orthopedics and obstetrics/gynecology, had the highest litigation rates. Orthopedics accounted for more than 50% of claims when excluding obstetrics and gynecology [2,3].

To address this critical issue, the Royal College of Surgeons published the Good Surgical Practices in 2008 and later updated them in 2014. These guidelines outline the recommended parameters to be included in operative notes. The updated 2014 version also suggests that operative notes should preferably be typed for every procedure [4]. The aim of this audit was to assess the hand-written operative note-keeping practices in Orthopedic Unit I of Dr. Ruth K.M Pfau Civil Hospital Karachi against these standard guidelines.

Dr. Ruth K.M Pfau Civil Hospital Karachi is a 1900 bedded tertiary care center and one of the largest hospitals in Pakistan. It witnesses a high patient influx and a significant volume of elective and emergency surgeries daily. The notes of the majority of these surgeries are recorded in a computerized manner using the Health Management and Information System (DOTS 78). In 2010, Khan et al. conducted an audit on the operative notes using this data retrieval system and assessed their compliance with the RCS guidelines [5]. However, the orthopedic department does not employ this computerized format and has its own handwritten operative notes proforma (Figure 2, 3). To the best of our knowledge, no prior audit of orthopedic operative notes has been done at Civil Hospital Karachi.

2. Methods

The audit was conducted in Orthopedic Unit I at Civil Hospital Karachi after seeking approval from the Head of the Department in March 2023. Data was collected by comparing the notes against a pre-designed form that enlisted the components of operative notes, as recommended by Good Surgical Practices (RCS). Consecutive sampling method was employed and data was collected from patient's file records. The initial audit was carried out between 5th March 2023 and 10th April 2023, collecting a total of 58 inputs. Following the completion of the first phase, a meeting was held on 15th April 2023 with the members of the Orthopedic Department including consultants, residents and junior doctors. The results of the audit were shared, the gaps were highlighted and identified, and the attendees were educated on the significance of recording accurate and detailed operative notes. A new format of the notes based on the RCS guidelines was also introduced during this meeting and the approval for its implementation was obtained (Figure 4, 5). Thereafter, a period of 2 weeks was given for the printing and application of the new operative note sheet and to allow the surgeons to adapt to the new format. The second phase for re-audit was started on 1st May 2023 and carried out till 30th June 2023 to collect 58 responses. The results of the re-audit were also shared with the department.

3. Results

In each cycle of the audit, a total of 58 notes were reviewed. All operative notes were handwritten and recorded by residents. The primary operating surgeons were either consultants or resident trainees in their third and fourth year of training. Notably, none of the notes were directly documented by the consultants themselves. Table 1 summarizes the results from both phases of the audit.

S NO.	Parameter	Frequency of documentation in initial audit (%)	Frequency of documentation in re-audit (%)	Change in frequency (%)
1.	Patient Identification	27.6	70.7	43.1
2.	Date	81.0	89.7	8.7
3.	Time	46.6	53.4	6.8
4.	Detailed post op notes	70.7	98.3	27.6
5.	Procedure type (Elective/ Emergency)	8.6	31.0	22.4
6.	Name of operating surgeon	89.7	98.3	8.6
7.	Name of assistant	86.2	87.9	1.7
8.	Name of theatre anesthetist	24.1	50.0	25.9
9.	Operative procedure	89.7	98.3	8.6
10.	Name of incision	37.9	79.3	41.4
11.	Operative diagnosis	44.8	94.8	50.0
12.	Operative findings	60.3	79.3	19.0
13.	Any problems/complications	12.1	44.8	32.7

14.	Any extra procedure performed and reason why it was performed	0	0	0
15.	Details of tissue removed, added or altered	60.3	74.1	13.8
16.	Identification of any prosthesis used, including the serial number of prosthesis and other implanted material	0	61.5	61.5
17.	Details of closure technique	53.4	77.6	24.2
18.	Anticipated blood loss	3.4	50.0	46.6
19.	Antibiotic prophylaxis	0	46.9	46.9
20.	DVT prophylaxis	0	0	0
21.	Signature	62.1	87.9	25.8
22.	Handwriting legibility	Poor 31.0	Poor 15.5	Poor -15.5
		Adequate 36.2	Adequate 51.7	Adequate 15.5
		Good 32.8	Good 32.8	Good 0

Table 1: Documentation of Parameters in the Initial and Re-Audit

In the initial audit, which analyzed 44 elective and 14 emergency case notes, the name of the operating surgeon and operative procedure were present in 89.7% of the notes (52), while the name of the assistant surgeon was present in 86.2% (50), making them the most frequently documented modalities. Patient identification, notably, was present only in 27.6% (16) of the notes. Moreover, date and time were recorded in 81% (47) and 46.6% (27) of the cases, respectively. Detailed post operative instructions were present in 70.7 % (41) records; however, only 8.6% (5) of the notes specified the procedure type - whether it was elective or emergency. Out of the 58 procedures, those involving the use of a prosthesis (5/58), an additional procedure (4/58), antibiotic prophylaxis (55/58) or DVT prophylaxis (35/58) had no documentation regarding their inclusion or details in the operative notes, making these parameters the least documented.

During the re-audit, operative notes for 55 elective and 3 emergency cases were evaluated. The name of the operating surgeon and operative procedure remained the most frequently documented factors, accompanied by detailed post-operative notes, being present in 98.3% (57) of the notes. Patient identification, which was previously found in only 27.6% of the records, was present in 70.7% (41) of the audited notes. The documentation of procedure type saw a significant rise, more than tripling to 31% (18), while the operative diagnosis was recorded twice as frequently compared to the initial audit - 94.8% (55). Any problems or complications were documented in 44.8% (26), which were previously present in only 12.1% of records. Among the 58 audited notes, 12 notes were of operations where an extra procedure was performed; however, its reason or details were absent in 100% of them. Of the 26 procedures that used a prosthesis, 61.5% (16) mentioned the prosthesis identification details. Moreover, antibiotic prophylaxis was applicable in 49 cases but was documented in 46.9% (23) cases only, while DVT prophylaxis was absent in 100% of the applicable cases (23). Figure 1 illustrates a graphical representation of the enhanced adherence to guidelines observed during the re-audit.

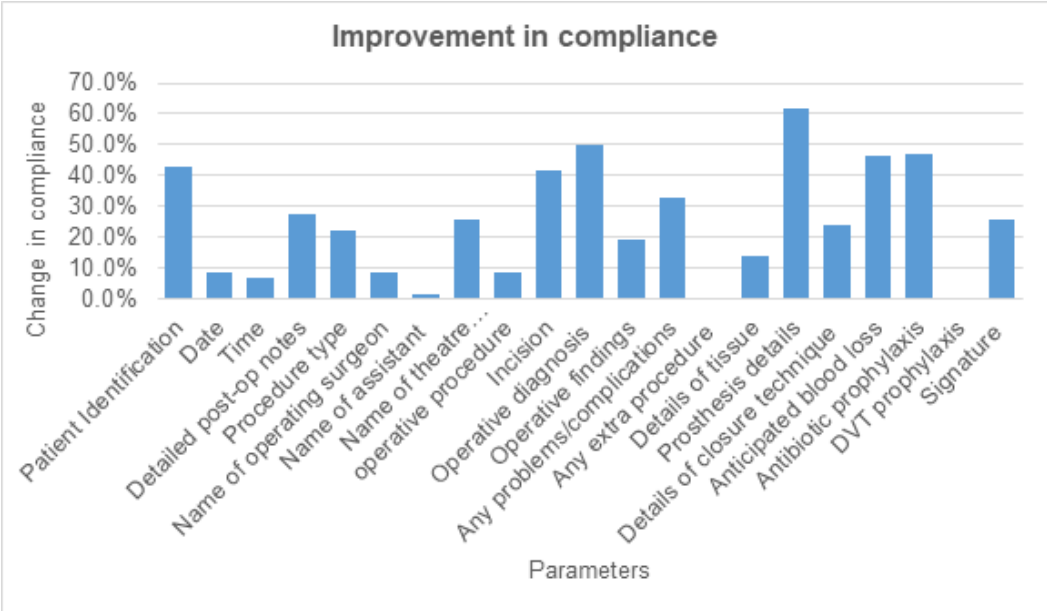

Figure 1: Improvement in Compliance to RCS Guidelines

4. Discussion

Well-crafted operative notes serve a crucial role in responsible medical record-keeping, a duty that must be diligently observed by the surgical team. Unfortunately, this duty is often neglected, as observed in our audit, potentially exposing the hospital to significant medicolegal liability related to medical negligence. Moreover, this oversight denies the patients a comprehensive record of essential medical information that could facilitate a more thorough evaluation of their medical history in the future and aid improved treatment plans.

During the first cycle of our audit, proper patient identification was absent in an alarming 72.4% of notes. This is of particular concern as accurate patient identification is paramount in preventing potentially catastrophic errors during post-operative care, thereby minimizing devastating consequences for the patient and medical lawsuits for the hospital. In 2016, ECRI Institute Patient Safety Organization (PSO) published "Deep Dive: Patient Identification" which summarized an analysis of more than 7,600 wrong-patient events. They found that more than half of the failures related to patient identification involved either diagnostic procedures (2,824 or 36.5%) or treatment (1,710 or 22.1%), and the two wrong-patient events associated with patient deaths involved documentation failures [6].

Fortunately, during the re-audit, patient identification recording substantially improved along with other parameters such as prosthesis details, antibiotic prophylaxis, surgical complications, incision name, theater anesthetist's name, and anticipated blood loss. However, documentation of 'any extra procedure performed and the reason why' and 'DVT prophylaxis' exhibited minimal to no improvement.

It is noteworthy that parameters with higher initial compliance rates surprisingly showed relatively less improvement in the re-audit, which was also observed in a similar study conducted in a tertiary care hospital in Lahore [7]. This can be attributed to the fact that most of these components were prominently present in the previous operative note format, thus the new form did not significantly impact their compliance rates. Their enhanced results observed are solely accredited to the training provided to the surgeons during the workshop conducted after the initial cycle was completed.

Our audit resulted in improvements in 20 out of 22 parameters, leading to an overall compliance improvement of 24.1%. This progress can be further credited to the structured format of the modified form, which incorporated allotted spaces for different components. This streamlined the documentation process for the surgeons and facilitated them in accurately recording key details with ease. In addition, the effective educational session on the importance of operative note documentation, conducted during the post-initial audit workshop, can be assumed to play a pivotal role. Perhaps future workshops should lay greater emphasis on the role of documenting 'DVT prophylaxis' and 'any extra procedure performed and reason why' in post-operative patient management, to produce similar favorable results.

A prominent concern highlighted by the re-audit was the limited improvement in handwriting legibility. The only discernible difference was that legibility was more frequently deemed adequate, documented at 51.7% up from the previous 36.2%. Conversely, the frequency of good handwriting legibility remained unchanged at 32.8%. Addressing this challenge presents difficulties, as teaching clear and comprehensible handwriting skills to residents through workshops or motivating them to improve is an inherently difficult task.

Fortunately, implementing an electronic system for note keeping has shown to resolve this problem, as demonstrated by several audits in the past. In a closed loop audit conducted by Anazor et al, the introduction of typed electronic notes after the initial cycle demonstrated marked improvement. Results found that 25% of the typed notes had 100% compliance, whereas none of the handwritten notes had achieved this. Moreover, documentation of clear and detailed post-operative instructions significantly improved, reaching 92% compliance compared to the initial 40% [8]. These findings underscore the pronounced enhancements in compliance that can be achieved through electronic note proformas. In a separate study conducted by the CDC, 74% of physicians emphasized the value of accessing patient information via electronic records, asserting that it enhances overall patient care [9]. This not only proves advantageous for the patient but also serves as a useful tool for functions associated with research, quality assurance, and billing [10,11].

In our setting, adopting these computerized formats is easily achievable at no additional cost or resources, as they are already in use across all surgical departments at CHK. This transition would ensure secure storage and easy accessibility of operative notes. Furthermore, these formats come with pre-filled templates that promote adherence by mandating specific headings for submission. In addition to introducing electronic proformas, evidence supports that designing procedure specific forms can significantly improve documentation statistics. An audit conducted in 2022 at a tertiary care center in central London effectively illustrated improved adherence to RCS guidelines through employing a procedure-specific form for laparoscopic appendectomies [12]. The average compliance after implementation of the proforma was 98.2%, with over 80% of operation notes satisfying all RS CEng criteria. Comparable findings were noted in another study assessing laparoscopic cholecystectomy records, which compared traditional operative notes with procedure-specific templates. The results revealed that in the traditional group, only 25% of notes were deemed complete, whereas in the template group, it was 79.2% [13].

While changes to the format and recording method of operative notes are necessary, addressing the knowledge gap among surgeons and residents regarding operative note writing guidelines is equally vital and has shown quality improvement in several studies [3]. In 2007, a study was conducted at our hospital, Dr. Ruth K.M. Pfau CHK, to assess the knowledge and teaching of operative notes amongst surgeons across various specialties. The study's findings were concerning: none of the participants were aware of any operative note writing guidelines, a mere 4.5% had received formal training in operative note writing, and the majority of surgeons (87.7%) recognized the need for national guidelines [14]. Despite these findings, even 16 years later, Pakistan has yet to establish its own official guidelines and knowledge regarding international guidelines, such as those provided by the RCS, remains limited to this day. In addition to this, an extensive multicenter retrospective analysis that utilized data from operative notes for inguinal hernia repair, interestingly observed that PGY1 had the highest rate of acceptable operative reports among the group comprising PGY1-PGY5 and attendings [15]. This reflects the necessity to bridge the knowledge gap in all groups, for which we propose conducting biannual teaching workshops aimed at providing formal training in operative note writing.

We also suggest reconducting this audit every six months to ensure ongoing enhancement and alignment with RCS guidelines. Moreover, we recommend the utilization of DOTS 78 computerized operative notes system for efficient operative record-keeping within the Orthopedic Unit. This electronic system will not only streamline the review process but also augment the effectiveness of subsequent audits.

5. Conclusion

The results of our survey highlight significant shortcomings in the documentation practices of operative notes within the orthopedic department, primarily stemming from a lack of awareness and adherence to relevant guidelines. It is also crucial to recognize that traditional handwritten notes have become an outdated method of documentation, being largely replaced by electronic operative note systems. Therefore, diligent measures must be taken to ensure appropriate patient care, maintain accurate patient records, and mitigate potential medico-legal liabilities for the hospital.

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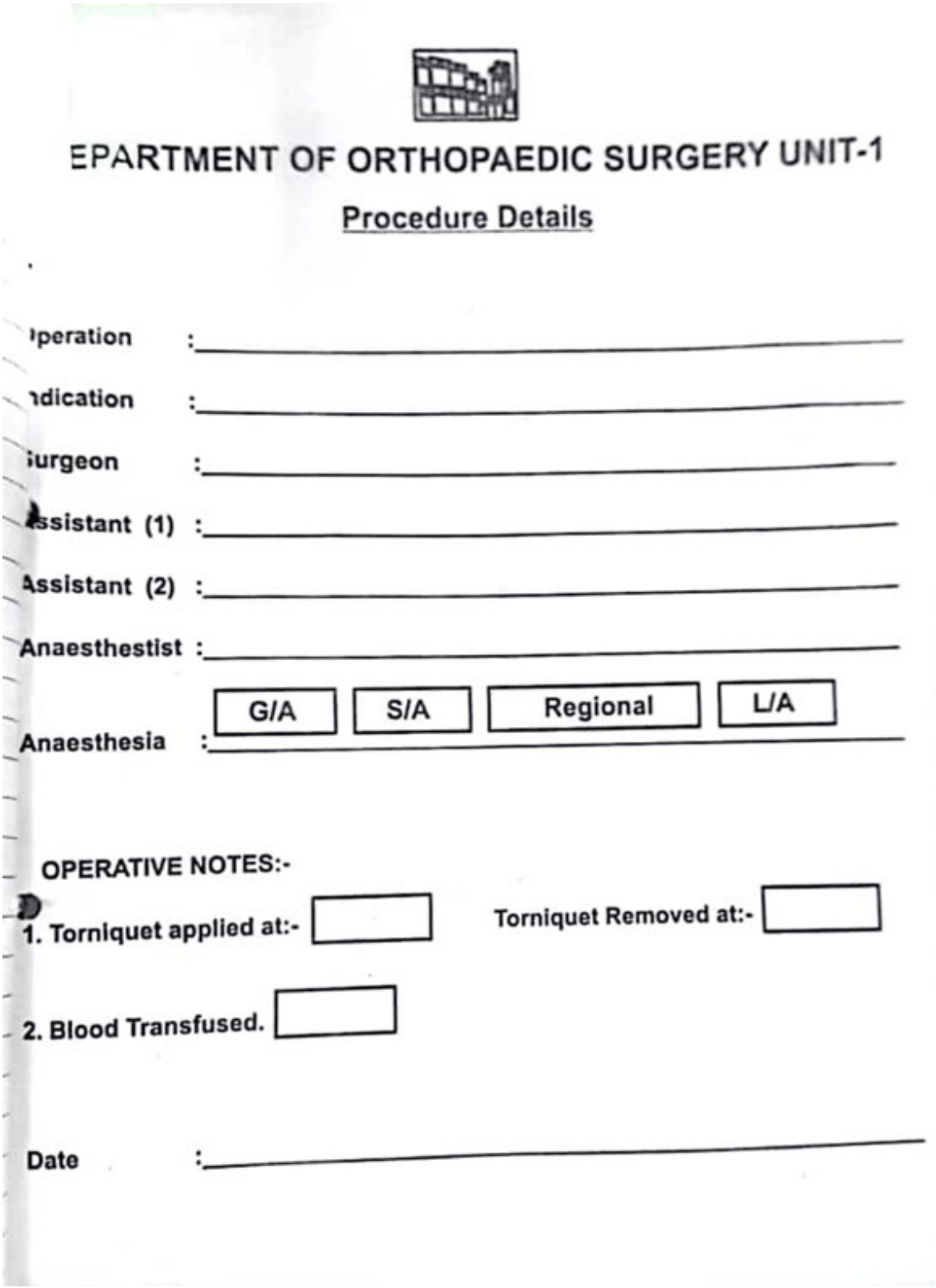
Appendices:



EPARTMENT OF ORTHOPAEDIC SURGERY UNIT-1

Procedure Details

Operation :

Indication :

Surgeon :

Assistant (1) :

Assistant (2) :

Anaesthestist :

Anaesthesia : G/A S/A Regional L/A

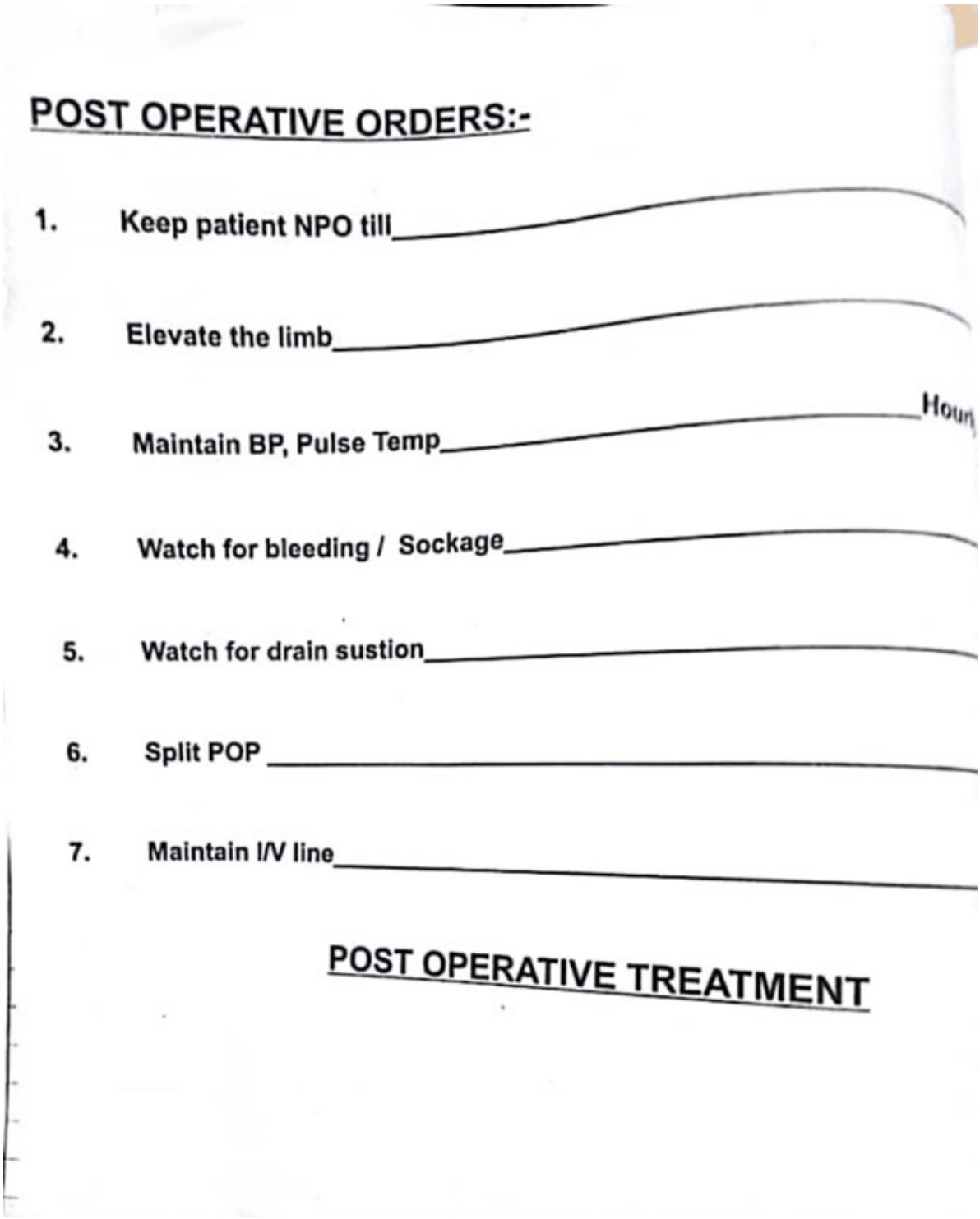
OPERATIVE NOTES:-

1. Torniquet applied at:- Torniquet Removed at:-

2. Blood Transfused.

Date :

Figure 2: Original Operative Note Form Page 1



POST OPERATIVE ORDERS:-

1. Keep patient NPO till

2. Elevate the limb

3. Maintain BP, Pulse Temp Hour

4. Watch for bleeding / Sockage

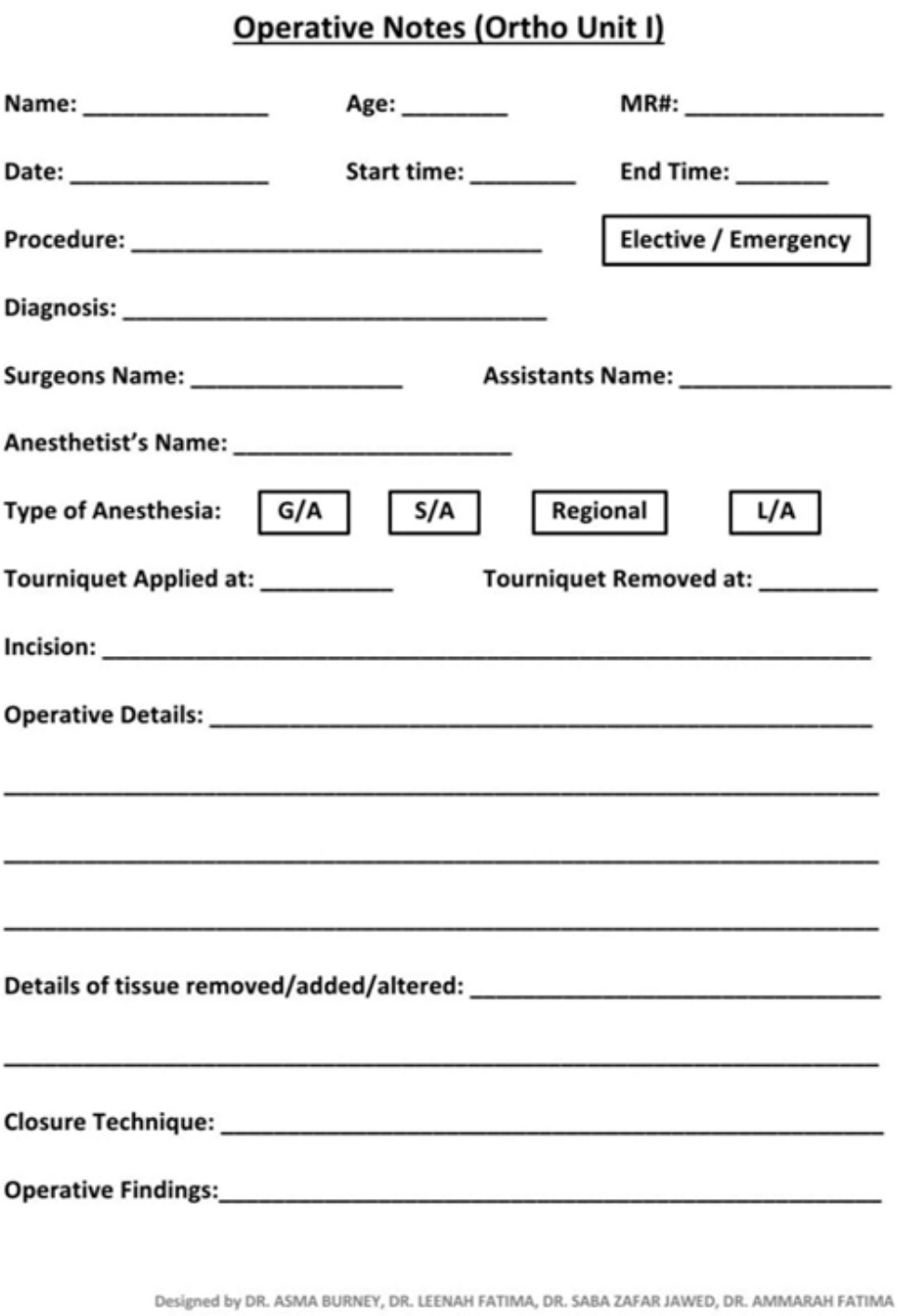
5. Watch for drain sustion

6. Split POP

7. Maintain I/V line

POST OPERATIVE TREATMENT

Figure 3: Original Operative Note Form Page 2



Operative Notes (Ortho Unit I)

Name: _____ Age: _____ MR#: _____

Date: _____ Start time: _____ End Time: _____

Procedure: _____ Elective / Emergency

Diagnosis: _____

Surgeons Name: _____ Assistants Name: _____

Anesthetist's Name: _____

Type of Anesthesia: G/A S/A Regional L/A

Tourniquet Applied at: _____ Tourniquet Removed at: _____

Incision: _____

Operative Details: _____

_____

_____

_____

Details of tissue removed/added/altered: _____

_____

Closure Technique: _____

Operative Findings:_____

Designed by DR. ASMA BURNEY, DR. LEENAH FATIMA, DR. SABA ZAFAR JAWED, DR. AMMARAH FATIMA

Figure 4: New Operative Note Form Page 1

Any Complication: _____

_____

Any extra procedure performed: YES NO

If yes, reason: _____

Implant Used: YES NO Implant Identification: _____

Blood Loss (ml) : _____ Blood Transfused (packs): _____

Antibiotic Prophylaxis: YES NO _____

POST OPERATIVE ORDERS:

Fluid:

Antibiotic:

Analgesia:

Additional instructions:

DVT prophylaxis: YES NO

SIGNATURE: _____

Designed by DR. ASMA BURNEY, DR. LEENAH FATIMA, DR. SABA ZAFAR JAWED, DR. AMMARAH FATIMA

Figure 5: New Operative Note Form Page 2