

## Bacterial touchscreens in Orthopaedic OT-Are we digging our own grave?

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### **Abstract:**

**Background:** Post operative wound Infection is a dreaded complication for orthopaedic surgeons. Usually when we are concerned about the disinfection and sterility protocols followed for OT complex, we seldom give a thought about the mobile phones we carry to the OT theatre.

**Aim:** To determine the bacterial colonization of mobile phones carried inside the OT and its association with post op wound surgical site infection.

**Methods:** We carried the study for a period of 2 months (Oct 20-Dec 20) and divided the study in 2 parts. In Part A we took swabs from 90 mobile surfaces and evaluated for growths. In Part B we took swabs for pus culture from post operative surgical site infection cases during those 2 months and evaluated the growths obtained.

**Result:** 85.55% of swabs from mobile surfaces showed growths. Major contaminants were coagulase negative staphylococcus aureus and MRSA. In surgical site infection pus swabs, the above mentioned organisms were identified.

**Conclusion:** Mobile phone surfaces harbour pathogenic organisms, which contaminate the OT complex and increase the risk of perioperative infection.

**Keywords:** mobile phones, coagulase negative staphylococcus aureus, MRSA, surgical site infection.

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### **I. Introduction:**

Mobile phones are indispensable accessories in our professional lives and its usage extends right inside the operating room for visualization of preop xrays, CT sections as well as for Arogyasri intraoperative photos and videos!

Mobile phones are used without restriction and disinfection inside the sterile areas like the operating room. Whenever a call comes, mobile surface gains access to heavy microbial load areas like the mouth, nose and ears. Contact with human hands and the heat generated from the device, provide just the appropriate moisture and temperature for organisms to grow and sustain.

Recent articles have highlighted the growth of microbial flora over mobile surfaces.

So, why not conduct a similar study in our orthopaedic OT and find out its correlation with infected post op surgical site dressings...?

**Aim:** To determine the bacterial colonization of mobile phones carried inside the OT and its association with post op wound surgical site infection.

### **II. Methodology:**

#### **PART A:**

The study was conducted over a period of 2 months from 20<sup>th</sup> Oct to 20<sup>th</sup> Dec 2021.

We obtained samples from the mobile surfaces of people attending the OT and divided them into 3 groups-

- A. Members washing for the case (operating surgeons and staff)
- B. OT personnel (C-arm operators)
- C. Technicians and helpers

90 swabs were taken from the mobile surfaces over a period of 2 months (30 from each group)

Swabs were taken by simple random sampling from the available members in the OT on the particular day.

#### **PART B:**

Simultaneously during this time interval, we evaluated post op wounds for signs of surgical site infection.

We applied the following criteria for them to include in our study-

INCLUSION CRITERIA	EXCLUSION CRITERIA
1.Swab taken after opening dressing for the first time post op	1.Compound fractures
2.Swabs taken after an antibiotic holiday for 72 hours	2.Pre existing abrasions/raw areas

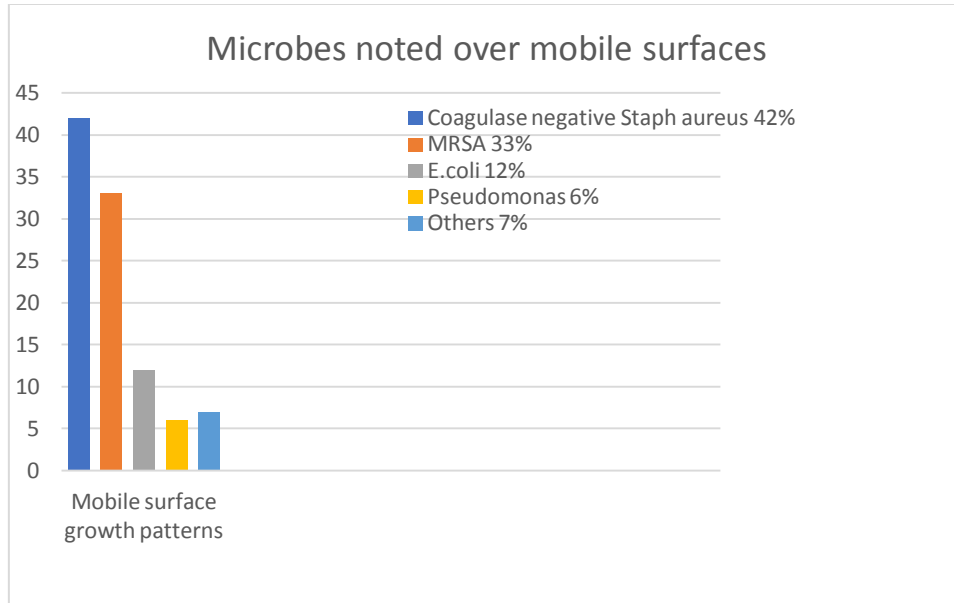
In our study of 2 months,we could obtain 12 cases of post op surgical site infection out of 307 operated cases .(SSI: 3.9%)

### III. Results:

Part A:

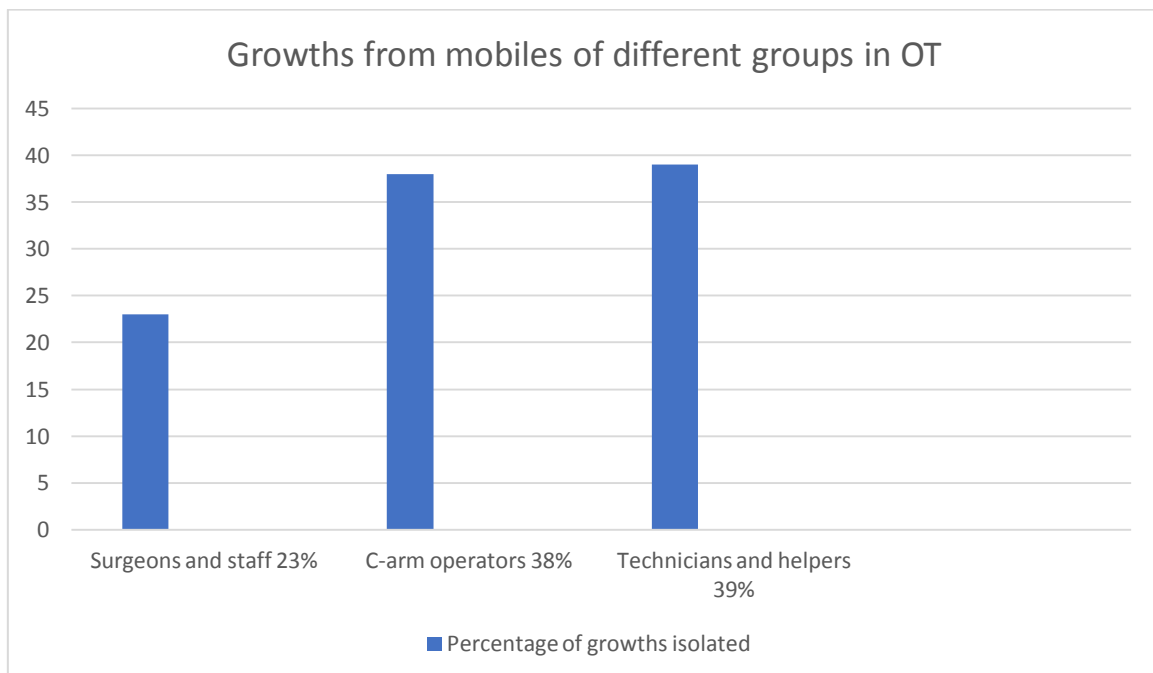
Out of 90 mobile phone swabs,growth was obtained on 77 phones (85.55 %)

The following growths were obtained-



Coagulase negative staphylococcus aureus and MRSA were noted majorly.

Demographically the swabs from the 3 groups showed growths noted from the mobile phones of technicians and helpers as the highest followed by OT personnel and lowest for members operating for the case.



Patient Name : MOBIL{16}  
Gender/Age : Male /32 Years  
Referred By : G.G.H

Patient Id/ Bil No. : 2776  
Reg. Date : 12-12-2021  
Reported Date : 14-12-2021

MICROBIOLOGY REPORT

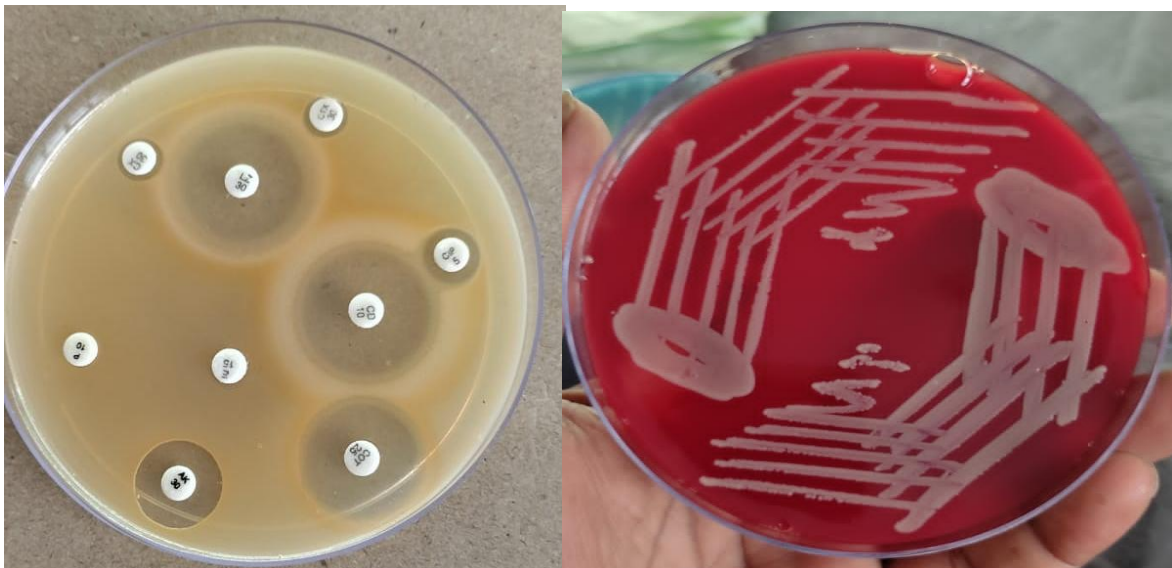
**Sample Analysed** : **Mobil Surface**

**Gram's Stain Report** : Few pus cells , Few Gram Positive CocciSeen

**Culture Report** : Coagulase Positive staphylococci (MRSA) grown in culture after 48 hours of aerobic incubation

**Sensitivity Report** : The Isolated Organism is ...  
**Sensitive to**  
1.Erythromycin  
2.Linezolid  
3.Clindamicin  
4.Ciprofloxacin  
5.Gentamycine  
6.Amikacin

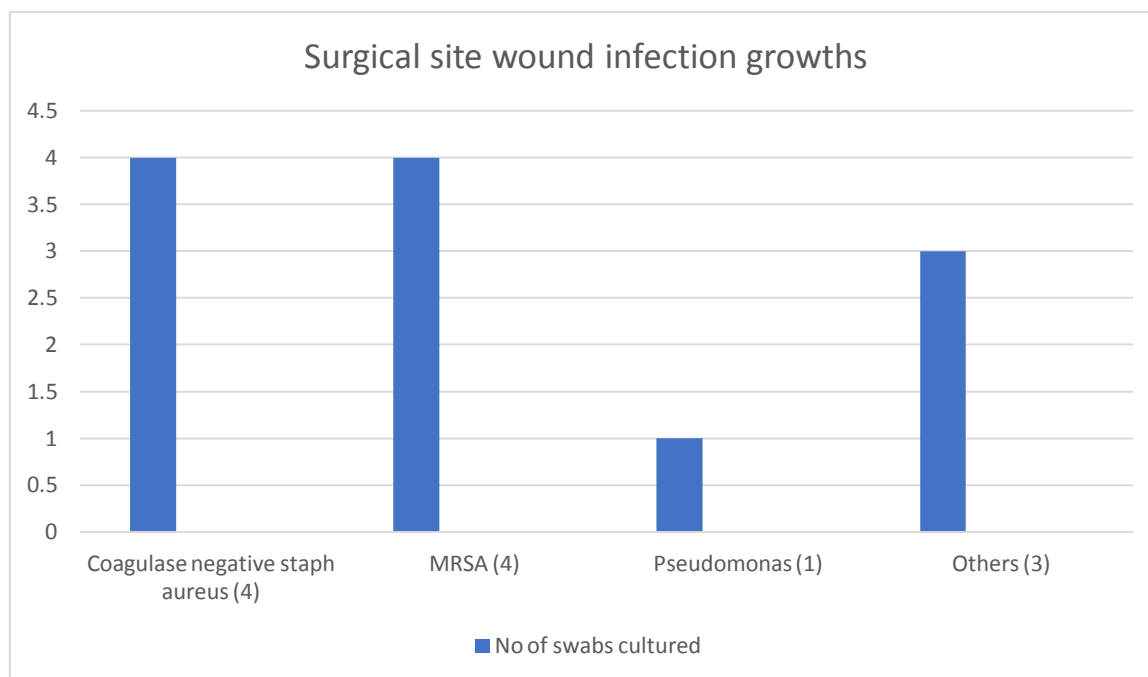
**Resistant to**  
1.Pencillin  
2.Cefotaxime  
3.Co- Trimoxazole



Antibiotic susceptibility test showing resistance to penicillin and cephalosporins suggestive of MRSA.

Part B:

Out of the 12 cultures sent for evaluation, we obtained the following growths-



**MICROBIOLOGY REPORT**

**Sample Analysed** : **PUS (Right Thigh)**

**Gram's Stain Report** : Few pus cells , Few Gram Positive CocciSeen

**Culture Report** : Coagulase positive staphylococci {MRSA} grown in culture after 48 hours of aerobic incubation

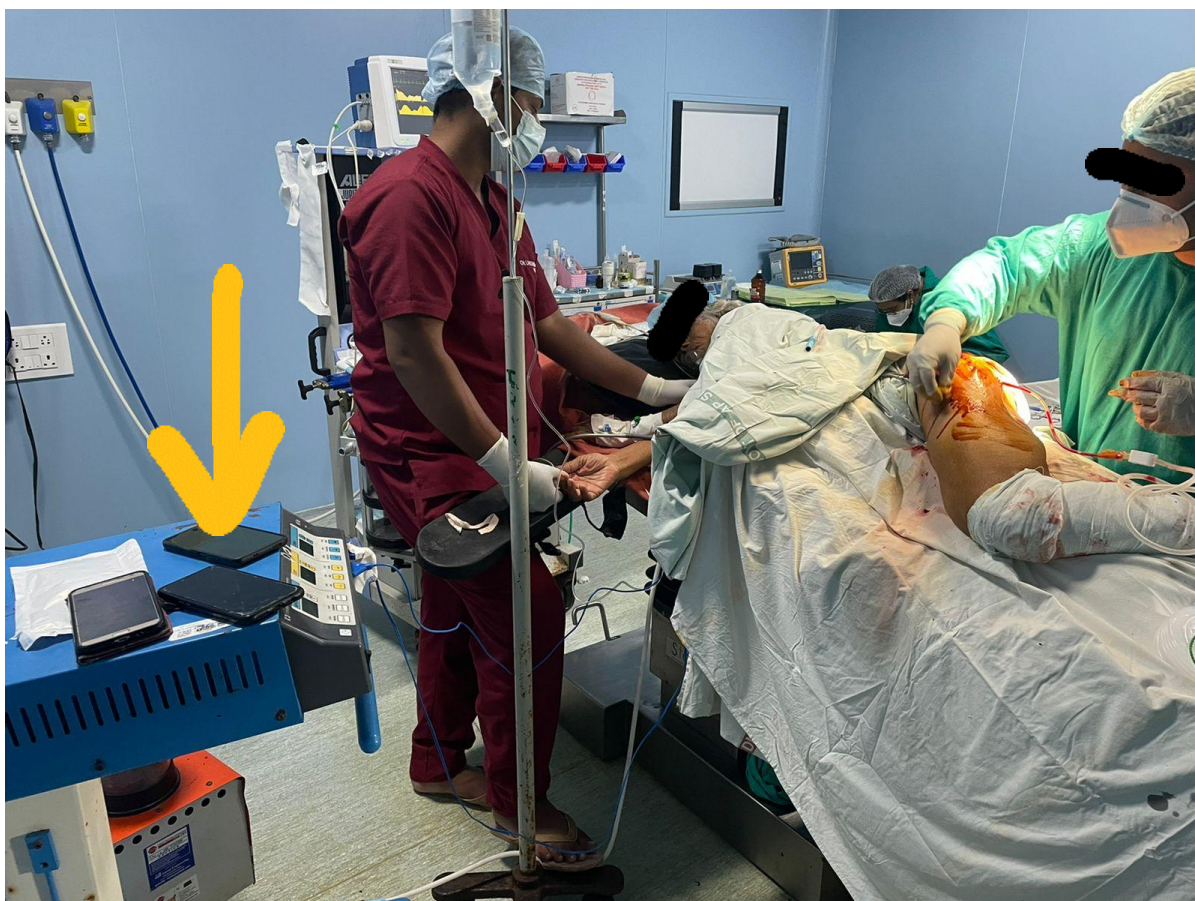
**Sensitivity Report** : The Isolated Organism is ...

<b>Sensitive to</b>	<b>Resistant to</b>
1. Erythromycin	1. Pencillin
2. Linezolid	2. Cefotaxime
3. Clindamicin	3. Co- Trimoxazole
4. Ciprofloxacin	
5. Gentamycine	
6. Amikacin	

In the growths isolated, Coagulase negative Staphylococcus aureus and MRSA were amongst the highest isolated.

**IV. Conclusion:**

- Mobile phones find themselves inside the OT theatre without any disinfection and near to the operating site.



*Note the cluster of mobiles and the proximity to the operating site*

- 85.55 % of mobile phone surfaces were contaminated with pathogenic organisms which is a significant proportion.
- The maximum isolates were noted from mobile surfaces of technicians and helpers adding to the risk of contamination during the perioperative period.
- The commonly isolated organisms both from mobile surfaces and post operative wound dressings were coagulase negative staphylococcus aureus and MRSA.
- This implicates a causative role of the microbes harboured on the surface of mobile, the risk of perioperative contamination and the need for applying disinfection strategies for the same.

#### **V. Discussion:**

Everyone of us carries mobile phones inside the OT. It is one equipment which doesn't need disinfection protocol and gains access right upto the OT table. We change our dress, mask and even footwear, keep our keys and wallets in the lockers provided outside the OT, but not mobile phones. A single phone may not amount to much contamination, however when this issue is amplified by numerous other contaminated cell phones, it makes the OT a breeding ground for infection and increases perioperative infection risk.

There are numerous ways in which contaminated hands already handling cell phones come in contact with people scrubbed in for surgery. Here are a few examples-





*Rearranging mask intraop with bare hands*



*Note the application of plaster over the suture site by helper carrying mobile moments prior to application.*



*Surgeon receiving calls in the middle of the OT, contaminated organisms gain access over the gown as the helper comes in contact as well.*

Strategies to reduce perioperative contamination due to mobile phones-

1. Sanitize your hands everytime you use mobile phones inside the OT.
2. While entering and before leaving disinfect your mobile phone surfaces with a alcohol based disinfectant.
3. Limit the usage when inside OT.
4. Follow the *sterile cockpit rules*, when in OT keep phones in silent/airplane to avoid disturbances and usage during OT.

#### **TAKE HOME MESSAGE:**

1. Mobile phones harbour organisms-human skin moisture and heat generated by the mobile act like a good incubation media
  2. Coagulase negative staph aureus and MRSA are the frequently isolated growths on mobile surfaces and post op surgical site wound infection.
  3. Mostly all carry their mobile phones right upto the OT and around 85% surfaces are contaminated.
  4. Perioperative usage and handling of mobile phones adds to the risk of surgical site infection post op.
  5. It can be prevented by simple measures like decontamination with alcohol based disinfectants, hand washing after mobile use and simply reducing its use while operating!
  6. Like all studies have their own drawbacks, our study is no different. The causation of postoperative wound infection is multifactorial and that mobile phones alone are responsible for it would be hypothetical.
- Our study just wants to imply the potential risk MOBILE PHONES carry when all that we fear the most is INFECTION..!**

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