



# ORTHO NEWSCAST



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Dear Doctor,

Greetings from Micro Labs. We are happy to bring you “Ortho Newscast” which contains latest and interesting news in the field of Orthopaedics.

**This issue contains**

- A study on association of 25-hydroxyvitamin D levels with lipid profiles in osteoporosis patients.
- A study on the versatility of the perforator radial artery flap in reconstructing the upper limbs and comparing the results with the “classic” radial flap
- A study on Ilizarov external fixator lengthening versus lengthening followed by plating in the treatment of paediatric femoral shortening
- A Case Report and Review of Treatment Options for Ollier Disease

Should you require any specific article or medical information, please feel free to contact us at [medicalservices@microlabs.in](mailto:medicalservices@microlabs.in)

Looking forward to your valuable feedback

Best Regards,

Medical Team, Micro Labs Limited

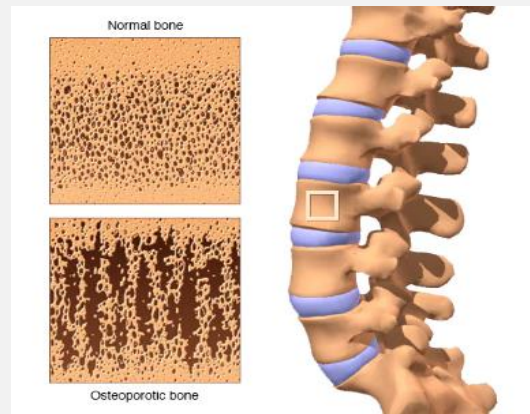


## A study on association of 25-hydroxyvitamin D levels with lipid profiles in osteoporosis patients.

### INTRODUCTION

Osteoporosis(OP) is a condition that affects the skeleton and is characterised by diminished bone mass and altered bone microarchitecture. Bone mineral density(BMD) is used to determine the diagnosis of OP <sup>(1)</sup>. Lack of calcium and vitamin D is a contributing factor to the development of osteoporosis <sup>(2)</sup>. Vitamin D has been linked to worsening diabetes, hypertension, arterial rigidity, left ventricular hypertrophy, and vascular dysfunction. Previous research revealed a favourable link between serum vitamin D3 and HDL cholesterol levels and a negative correlation between vitamin D3 and LDL cholesterol levels <sup>(3)</sup>. However, Limited information exists regarding the connection between vitamin D and cholesterol levels in individuals with OP. This study aimed to explore the relationship between vitamin D levels and lipid profiles in osteoporosis patients. The

goal is to suggest how vitamin D supplements might help reduce cardiovascular risk, as heart issues are a significant concern for osteoporosis patients.



OSTEOPOROTIC BONE

**Vitamin D could benefit both bone health and blood lipid levels, potentially aiding in the prevention of cardiovascular disease(CVD) for osteoporosis patients.**

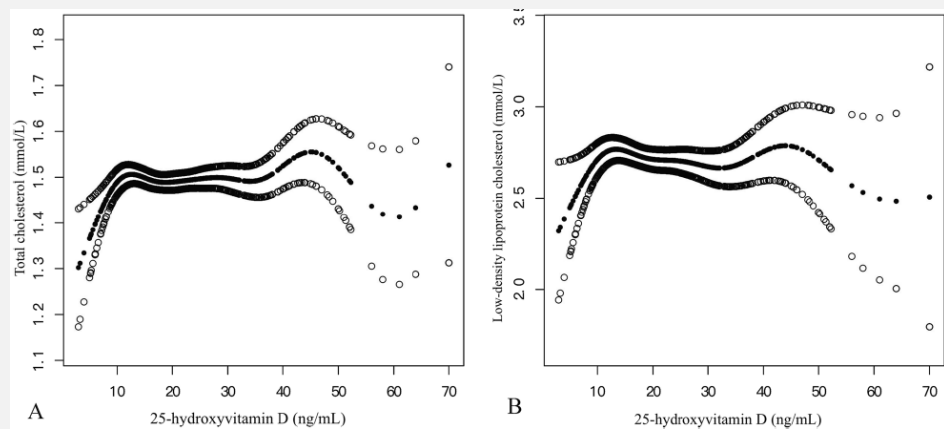
### METHODS

A retrospective cross-sectional study involved 2063 patients with osteoporosis who underwent lipid blood analysis during hospitalization. The blood samples were taken in the morning after fasting, and lipid levels were measured. The study assessed variables such as total cholesterol(TC), low-density lipoprotein cholesterol (LDL-C), triglycerides (TGs), apolipoprotein-A (APO-A), high-density lipoprotein cholesterol(HDL-C), and lipoprotein A (LPA) as dependent variables, with 25(OH)D levels as the main exposure variable. Factors like age, sex, BMI, season, year of blood collection, diagnosis, hypertension, diabetes, statin use, Beta-C-terminal telopeptide of type I collagen ( $\beta$ -CTX), and procollagen type I N-terminal propeptide (P1NP) were considered as covariates. The relationships between serum lipids and 25(OH)D levels were examined through Multiple regression. Blood samples were collected after overnight fasting and analyzed using an automated electro-chemiluminescence immunoassay. The study also employed a generalized additive model to explore nonlinear associations, with the curve smoothing assessed using two-piecewise linear regression.



## RESULTS

This study found that 25OH(D) serum levels were inversely linked to TG levels and positively associated with HDL and APO-A levels. In terms of covariates, TC, TG, HDL, LDL-C, and APO-A concentrations were positively associated with blood lipids and serum Ca<sup>2+</sup> levels.



**Figure 1** Adjusted smoothed curves to show how 25(OH)D levels relate to TC(A) and LDL-C(B). A non-linear relationship with distinct thresholds between 25(OH)D and TC, LDL-C was found among OP patients. The upper and lower curves represent the 95% confidence interval and middle curve shows the correlation between 25(OH)D and TC, LDL-C. Interestingly, the middle curve showed a critical point(K) at 10.04 ng/mL.

Females had higher TC, TG, and LDL-C levels than males, with osteoporotic fracture (OPF) patients showing lower lipid levels compared to OP patients without fractures. A negative connection between serum 25(OH)D and TG levels was shown in multiple linear regression analysis. A 10 ng/mL increase in 25(OH)D led to a 5-6% decrease in TG levels. Additionally, there was a positive correlation between 25(OH)D increase and a 4% rise in HDL levels. To illustrate the nonlinear link between serum 25(OH)D and blood lipids, this study employed threshold effect analysis. The outcomes reflect a nonlinear relationship between 25(OH)D, TC, and LDL-C. Using a two-piecewise linear regression model, a turning point (K) of 10.04 ng/mL for serum 25(OH)D was established. A significant positive association between serum 25(OH)D levels and TC was identified when 25(OH)D ranged from 0 to 10.04 ng/mL. No such link was found when 25(OH)D was >10.04 ng/mL. Similarly, a strong positive relationship between LDL-C and 25(OH)D was evident within the same range. No substantial association between LDL-C and 25(OH)D was observed when serum levels of 25(OH)D exceeded 10.04 ng/mL. The relationship is depicted in Figure1. Differences in lipid markers were observed between various BMI subgroups in the osteoporosis population, emphasizing the impact of BMI classification on studying osteoporosis and lipid metabolism. Choice of BMI classification affected results, particularly in TC, HDL, LDL, APO-A, Lp(a), and triglyceride groups, indicating BMI's significance in this relationship. Further research is needed to confirm and understand these associations.

## DISCUSSION

The current study extended current knowledge by revealing an autonomous connection between vitamin D levels and blood lipid profiles in individuals with osteoporosis and there was a positive association between 25(OH)D levels and TC and LDL-C levels, when 25(OH)D ranged from 0 to 10.04 ng/mL, but not when levels were above 10.04 ng/mL<sup>(1)</sup>. The study by Zhang L et.al., showed that osteoporosis may be linked to low HDL and high LDL cholesterol



levels in postmenopausal women<sup>(4)</sup>. As the blood vitamin D level increased, a gradual decrease in TC, LDL, and non-HDL cholesterol was seen. In individuals who are obese, 25(OH) D is negatively correlated with total cholesterol, LDL cholesterol, and non-HDL cholesterol<sup>(5)</sup>.

## CONCLUSION

Higher blood levels of 25(OH)D in people with osteoporosis were associated with decreased triglyceride(TG) levels and higher levels of HDL, APO-A, and LPA. When 25(OH)D levels were between 0 and 10.04 ng/mL, a positive correlation between TC and LDL-C levels and 25(OH)D levels was seen, but not when levels were above 10.04 ng/mL. This shows that vitamin D may help maintain healthy blood lipid levels and bone health, which may help osteoporosis patients avoid cardiovascular disease (CVD).

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## A study on the versatility of the perforator radial artery flap in reconstructing the upper limbs and comparing the results with the “classic” radial flap

## INTRODUCTION

Soft tissue loss coverage is a crucial aspect of hand surgery departments. It's important for safeguarding vital structures, achieving functional recovery and obtaining esthetic results. With advancements in biological repair, skin blood supply research and reconstructive

**All surgeons who approach reconstruction of the elbow, forearm, and hand should keep the radial artery perforator flap in mind. It should be preferred, whenever possible, to the traditional radial forearm flap.**



surgery knowledge, hand surgeons now have a wide array of techniques for treating such defects<sup>(1)</sup>. The Reverse radial forearm flap (RFF) can be used to treat wrist, palm, dorsum, proximal fingers, and thumb abnormalities, however because the radial artery is sacrificed, it is not advised for patients who have insufficient ulnar artery input<sup>(2)</sup>. The radial artery perforator flap (RAPF) offers benefits like preserving major vessels and reducing donor site issues, but it has drawbacks due to its smaller size and delicate nature<sup>(1)</sup>. No previous studies compared RAPF to the classic RFF. To compare results, a retrospective analysis was done on patients who had one of those two flaps (RAFT, RFF) used during surgery.

## METHODS

The retrospective study involved 20 patients (11 males and 9 females) aged 53 years old who underwent surgery. The study included cases that met specific criteria: tissue loss of at least 5 cm × 5 cm in the elbow, forearm, or hand treated with either a classical radial forearm flap or a radial artery perforator flap; patients aged 18 to 70; and a minimum one-year follow-up. The study comprised 20 patients, with 10 in each treatment group (group A: classical RFF, group B: RAPF). Group A patients had positive Allen tests, while group B patients underwent Doppler examinations to locate the perforator before surgery. All surgeries were done by the same qualified surgeon. Patients were discharged from the hospital two days post-surgery and followed up at various intervals. The Vancouver Scar Scale (VSS) was used to assess results at the donor site and flap twelve weeks after surgery. Reintervention and failure rates within one year, as well as patient satisfaction using a visual analog scale (satiVAS), were also evaluated. Statistical analyses involved t-tests and chi-square tests to compare means and distributions, respectively, with a confidence level of 0.05.



**Figure 1** A patient who required an RAPF distally pedicled to cover the oncological excision due to a synovial sarcoma recurrence on the dorsum of the left hand. Preoperative drawing in (a); immediate postoperative care in (b); 2-week follow-up in (c); flap in (d); and donor location in (e) at 1-year follow-up.

## RESULTS

In group A, tissue loss reasons varied, treated with RFF, either due to trauma, tumor excision, or vasculitic ulcer. Group B experienced soft tissue loss due to trauma, tumors, vasculitic ulcers, radiodermatitis, and infections, with various treatment approaches. All patients in group A had successful surgery without needing further procedures. In group B, three patients required a second surgery, but nine had successful flap outcomes. Flap VSS scores were comparable, while donor site VSS scores were notably better in group B. Patient satisfaction



was similar in both groups. Full results and p-values are detailed in Table 1. Group A had no reported complications. In contrast, three group B patients faced complications requiring revision surgery. In two cases, the superficial flap layer was affected, while underlying tissue remained healthy. These patients underwent skin removal, with one needed a graft and the other healed naturally. Both had cardiovascular issues. The third patient, with a forearm sarcoma, needed a second surgery after chemo- and radiotherapy due to flap necrosis. Reconstruction was eventually done using an anterolateral thigh flap. To showcase the versatility of the RAPF, the researchers presented two clinical cases. Case One involved a 55-year-old female patient (FIGURE 1) with a recurring synovial sarcoma on her left hands dorsum. After excision and radiotherapy elsewhere, patient had radio dermatitis. An RAPF of 6 cm × 8 cm was used to reconstruct the soft-tissue defect. The second case featured a 64-year-old male with a necrotic ulcer due to vasculitis. A RAPF was employed for reconstruction, achieving excellent satisfaction and quality results.

TABLE 1- RESULTS

|                            | Group A | Group B | P value  |
|----------------------------|---------|---------|----------|
| Success rate (%)           | 100     | 90      | 0.00118  |
| Secondary surgery rate (%) | 0       | 30      | <0.00001 |
| Mean VSS flap              | 3.9     | 3.75    | 0,80,141 |
| Range                      | (2–7)   | (2–5)   | /        |
| Standard Deviation         | 1.4     | 1.0     | /        |
| Mean VSS donor site        | 6.1     | 3.1     | 0.00002  |
| Range                      | (3–8)   | (2–5)   | /        |
| Standard Deviation         | 1.7     | 1.0     | /        |
| satiVAS                    | 8.9     | 9.2     | 0.43319  |
| Range                      | (7–10)  | (8–10)  | /        |
| Standard Deviation         | 1.0     | 0.6     | /        |

## DISCUSSION

In current study, RAPF effectively addressed large tissue losses across various anatomical regions, yielding excellent aesthetic outcomes without affecting major vessels<sup>(1)</sup>. The study by Jovanovic M et.al., showed, RAPF was proved to be a reliable flap for reconstructing soft tissue in the upper limb. The majority of individuals who underwent this surgical procedure experienced outstanding functional and aesthetic results. Complex surgical operations, such as the restoration of tendons, joints, or the stabilisation of fractures, may be performed concurrently. The clinical results supported the dependability and safety of these flaps<sup>(3)</sup>.

## CONCLUSION

According to the study's findings, RAPF should be preferred above other regional perforator flaps including the conventional radial forearm flap. Large tissue losses in diverse anatomical locations are efficiently addressed by the RAPF, producing great cosmetic results without having an impact on main arteries. The traditional radial forearm flap, however, may be advantageous for individuals with cardiovascular issues, diabetes, or who smoke in order to avoid complications.

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## A study on Ilizarov external fixator lengthening versus lengthening followed by plating in the treatment of paediatric femoral shortening

### INTRODUCTION

Femoral shortening among children presents a difficult situation involving intricate functional and psychological consequences. Failing to address this bone length reduction during growth could potentially result in additional orthopaedic issues and complications such as scoliosis and joint deterioration <sup>(1)</sup>. Although congenital, post-traumatic and post-infectious factors are the primary reasons for femoral shortening, less common factors such as vascular insufficiency, neuromuscular disorders and tumour removal can also contribute to the development of shortening <sup>(2)</sup>. Limb lengthening procedures correct shortening, with evolving devices. Bone lengthening followed by submuscular plating, reduced post-removal bone fractures in children <sup>(3)</sup>. Hence, this study compared ilizarov external fixator(IEF) lengthening with lengthening and plating (LAP) for managing femoral shortening in children.

**Limb lengthening using lengthening and plating (LAP) might be more effective than utilizing ilizarov external fixator(IEF) alone for treating femoral shortening in children.**

### METHODS

The prospective comparative randomization study involved 40 children aged 5 to 17 years. The average age at the time of surgery was 11.25 years in group I and 10.05 years in group II, with 21 males and 19 females. The study focused on those with femoral shortening of 3.5 cm to 10 cm due to various causes. The children were divided into 2 groups. Group I underwent distraction osteogenesis using IEF until the desired length was reached, followed by frame removal and insertion of a submuscular locked titanium plate. In contrast, group II received distraction osteogenesis using IEF alone. Patients were regularly evaluated every 2 weeks. The 2 groups were analysed for various postoperative factors like external fixator duration, healing index, knee range of motion(ROM), alignment, time to full weight-bearing, hospital stay, anesthesia exposure and complications. SPSS version 22 was used to analyse data.

### RESULTS

The most common cause of femoral shortening was Congenital femoral shortening type 1. The follow-up time averaged 24.05 months. Group I had an average shortening amount of 6.60 cm,



while group II had 5.78 cm. The gained length was 5.60 cm in group I and 5.48 cm in group II. Residual shortening occurred on 45% of group I and 5% of group II patients. group I had a shorter external fixator period, better healing index and achieved full weight-bearing earlier than group II. Hospitalization for group I lasted longer, with 90% admitted for over

2 weeks, while in group II 85% were admitted for less than 2 weeks. Group I had more readmissions, all patients were readmitted multiple times compared to group II where only 3 patients had two readmissions (TABLE 1). Complications were fewer in group I (35%) than group II (55%). Group I patients had limited knee flexion and extension issues, while group II had transient stiff knees. Alignment issues were present in both groups. The healing index had no significant correlation with age or gender but positively correlated with gained length and full weight-bearing.

**TABLE 1- Comparison of ilizarov external fixator(IEF) lengthening with lengthening and plating (LAP)**

| Item                                                  | Group I<br>(n= 20) | Group II<br>(n= 20) | P-value |
|-------------------------------------------------------|--------------------|---------------------|---------|
| Shortening: (cm)                                      | 6.60               | 5.78                | 0.119   |
| Lengthening: (cm)                                     | 5.60               | 5.48                | 0.527   |
| Residual shortening:<br>n/%                           | 9(45%)             | 1(5%)               | 0.003*  |
| External fixator<br>period: (months)                  | 3.96               | 5.98                | <0.001* |
| Distraction index:<br>(days)                          | 56.00              | 54.75               | 0.527   |
| Healing index:<br>(days/cm)                           | 24.6               | 36                  | <0.001* |
| Full weight-bearing<br>after lengthening:<br>(months) | 5.55               | 7.03                | <0.001* |
| Hospitalization: (days)                               | 19.40              | 15.65               | <0.001* |
| Readmission: n/%                                      | 20(100%)           | 3(15%)              | <0.001* |

## DISCUSSION

In the present study, the average healing index was found to be lower in group I compared to group II. Group I patients had limited knee flexion and extension issues, while group II had transient stiff knees<sup>(3)</sup>. Munajat et al. used a similar LAP approach to enhance the healing index and obtained similar outcomes and the study documented stiffening of the knee as an adverse effect of LAP. Among their patients, 3 experienced temporary knee stiffness which resolved effectively through physiotherapy, while 1 patient required quadricepsplasty to enhance knee flexion<sup>(4)</sup>.

## CONCLUSION

This study showed that utilizing the LAP method could be more effective than relying solely on IEF for lengthening in treating femoral shortening in children. The LAP technique offered advantages such as decreased external fixator duration, early weight-bearing, improved healing index and fewer complications.

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## A Case Report and Review of Treatment Options for Ollier Disease

### INTRODUCTION

Ollier disease(OD) is a rare congenital skeletal illness that mainly affects children under the age of 10. Multiple enchondromas that grow in the medullary cavities of the long bones in the hands, the tibia, and, less frequently, the pelvis, are its defining features. Nevertheless, they can also develop in other parts of the appendicular skeleton <sup>(1)</sup>. It is not widely recognised among orthopaedic surgeons since it is uncommon in general. Medical professionals should however advise patients to have routine follow-up exams because of the rate of malignant change. <sup>(2)</sup>. This report outlines the scenario involving an 11-year-old girl who visited a doctor due to experiencing pain and swelling in her right ring and small fingers after participating in pool activities, despite no clear injury mechanism.

**The main objectives of surgery in Ollier disease is to correct deformities and avoid cancer. In the most severe circumstances, limb-lengthening treatments or amputation may be required as part of the surgical treatment.**

### CASE PRESENTATION

An 11-year-old girl who was healthy and active came to an outpatient clinic with right ring finger soreness and swelling that started five days before the initial evaluation. The girl started experiencing pain while having fun in a pool with her buddies. A physical examination revealed no evident deformity, a little amount of oedema, and focused pain to touch at the base of the right ring finger. No rotational misalignment was visible. Pain limited the active range of motion. The fourth proximal phalanx of the finger had a non-displaced fracture, which was the result of a benign-looking mid-diaphyseal enchondroma, according to radiographs of the finger. Radiographs also showed mid-diaphyseal

**Figure 1 Right hand, as seen from the PA**





enchondromatosis in the fourth and fifth metacarpals, as well as the fifth proximal phalanx (figure 1,2). Since the fracture was not dislocated, no immediate surgical intervention was expected and it was anticipated that the fracture would heal on its own. No new areas of pathology were found in subsequent radiographic scans. In order to promote healing, the fracture was immobilised. Plans for a future corticoplasty and graft will be made for the patient when skeletal maturation symptoms appear.

## DISCUSSION

In the present case, 11 year old girl showed mid-diaphyseal enchondromatosis on radiographic examination<sup>(1)</sup>. The patients with OD are identified while they are younger. Before the age of 20, the majority of patients had enchondroma as diagnoses<sup>(3)</sup>.

## CONCLUSION

Ollier disease is quite uncommon. It can manifest in many different ways, such as accidental discoveries, pathological fractures, and differences in limb length. Due to this variation, making the diagnosis could be difficult. Additionally, clinical management is challenging to establish and has to be based on a variety of factors. In this situation, surgery's primary goals are to treat abnormalities and prevent malignancy. In the most extreme cases, surgical therapy may also include limb-lengthening procedures or amputation. Consideration of careful planning is also crucial.

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Figure 2 Right hand, viewed laterally



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