Beyond the Drain – The Future of Chest Drainage.

It's been a long shift. You're doing your rounds, moving from patient to patient, crouching beside beds to check chest drains, taking readings and recording observations.

Then you do it again. And then .... again.

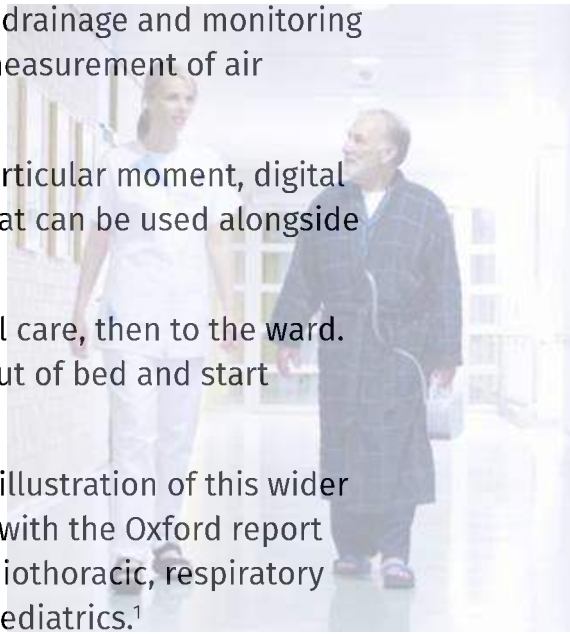
It may be a routine part of chest-drain management, but this 135-year-old technology of conventional underwater seal drainage places considerable emphasis on manual observation and interpretation. For nursing teams, that means careful attention to the drain, its set-up and its ongoing management. For clinicians, those observations contribute to decisions about the patient's progress and future treatment.

But what if chest drainage could give the clinical team more?

Objective information, support earlier mobility and travel with the patient as care progresses through the hospital.

That is where digital chest drainage begins to change the conversation.

Chest drainage is rarely an isolated event.



The **Medela Thopaz+** is a compact, portable digital chest drainage and monitoring system. It combines regulated suction with continuous measurement of air leakage and fluid drainage.

Rather than relying solely on a visual assessment at a particular moment, digital monitoring provides objective information and trends that can be used alongside the wider clinical picture.

The patient may move from theatre to recovery or critical care, then to the ward. They may need imaging, rehabilitation or simply to get out of bed and start moving again.

Real-world experience at Oxford provides an interesting illustration of this wider role. Thopaz was initially adopted within cardiothoracic, with the Oxford report subsequently describing Thopaz+ experience across cardiothoracic, respiratory medicine, critical care and intensive care, trauma and paediatrics.[1]

The significance is not simply that one product can be used in several departments. It is that different parts of the hospital can benefit from different aspects of digital drainage.

[1] Real-world experience with Thopaz+ The Oxford Story

Objective clinical information

One of the most significant changes digital drainage introduces is the ability to turn drainage into objective clinical information.

Thopaz+ continuously measures and records air leakage and fluid drainage, giving clinicians visibility of trends over time.

That changes the nature of the information available to the clinical team.

Instead of simply asking: *"Is the drain bubbling?"* the conversation can include: *"What has been happening to this patient's air leak over time?"*

This is where the thinking behind Drainology becomes particularly relevant. The Drainology study referenced in the Oxford material examined chest-drain management following general thoracic surgery using air leakage, rather than fluid output, as the criterion for drain removal.

The wider principle is powerful: better information can support better-informed clinical decisions.

Mobility is part of recovery

Digital drainage can also change a very practical aspect of the patient's experience.

A patient who requires suction does not necessarily need to remain connected to wall suction. The Oxford experience describes Thopaz+ operating portably for up to 10 hours on battery, allowing drainage therapy to continue while the patient mobilises or moves between clinical areas.

That can mean something as simple as getting out of bed, walking to the bathroom or moving around the ward.

It can also make a difference when the patient needs to leave the ward. The Oxford report describes patients attending imaging without the same restrictions associated with wall suction and, in its initial experience, patients could attend X-ray without a nurse escort, releasing nursing time.

For the patient, greater freedom to mobilise can support the wider recovery pathway. For the healthcare team, portability can make managing that pathway simpler.

Taking drainage with the patient

This versatility also gives Thopaz+ relevance beyond the traditional thoracic ward. Because it is a compact, lightweight, portable system with regulated suction, drainage can continue as the patient moves between appropriate care environments rather than the technology defining where the patient needs to remain.

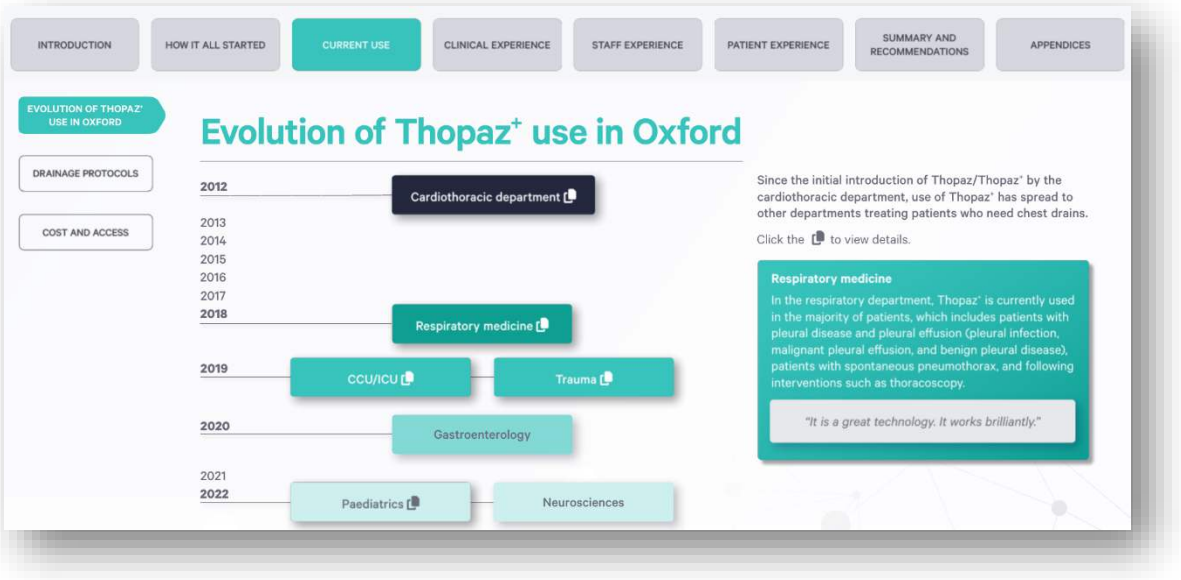
The Oxford experience illustrates Thopaz+ being used through different stages of the patient journey, including theatre, transportation, critical care and the ward.

In this context, the value proposition becomes much broader than chest drainage alone. It becomes about continuity of drainage across the patient's pathway.

Supporting different areas, different priorities

That wider perspective also helps explain why digital drainage has relevance to different specialties.

Real-world experience with Thopaz+ The Oxford University Hospitals NHS Foundation Trust experience



For **Thoracic and Cardiac teams**, objective air-leak and drainage information can contribute to decisions around chest-drain management.

For **Respiratory and Pleural teams**, the Oxford experience includes patients with pneumothorax and pleural disease and those undergoing pleural procedures.

For **Critical Care and Trauma**, the combination of continuous monitoring, regulated suction and portability can support chest drainage as patients move through different care environments.

And within **Paediatrics**, the Oxford experience highlights the role of accurate measurements in establishing a clear plan for discharge.

The technology is the same. The clinical need and the benefit can be different.

What about safety?

The development of digital drainage also raised another interesting question around the traditional underwater seal system.

Research undertaken by a thoracic team at Guy's and St Thomas' NHS Foundation Trust during the COVID-19 period investigated aerosol generation associated with different chest-drainage systems, including a single-chamber system, a three-compartment wet-dry suction system and a digital drainage system.

The original concern was particularly relevant during the pandemic because SARS-CoV-2 could remain viable in experimentally generated aerosols for hours, highlighting the importance at that time of understanding potential aerosol-generating routes. [2]The underlying aerosol-stability research was reported in the *New England Journal of Medicine*.

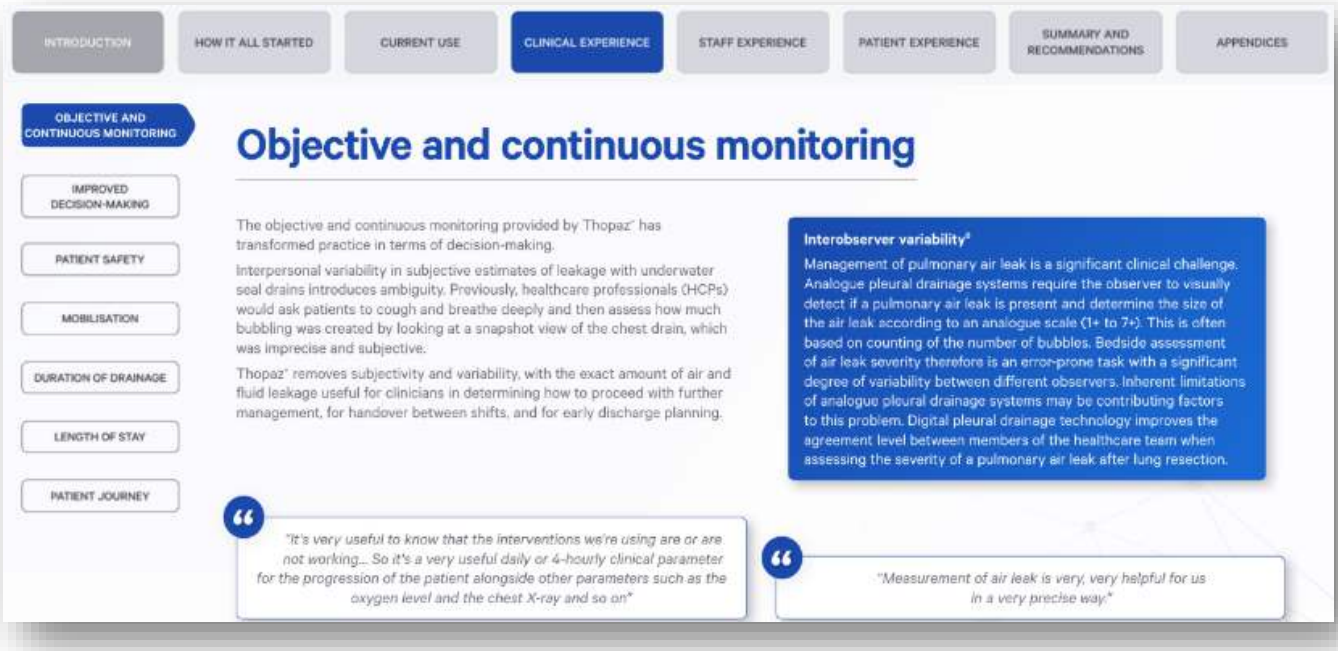
Today, the wider point is less about COVID-specific practice and more about the fact that chest drainage technology affects not only drainage itself, but how the system interacts with patients, clinicians and their surrounding environment.

Supporting the wider recovery pathway

This is also why digital drainage fits naturally into discussions around Enhanced Recovery After Surgery.

The Oxford material notes the importance of proactive chest-tube management within ERAS [*Enhanced Recovery After Surgery*] pathways and references ERAS/ESTS [*European Society of Thoracic Surgeons*] guidance recommending digital drainage systems for perioperative management following thoracic surgery.

When chest drainage provides objective measurements while allowing the patient to mobilise and progress through different stages of care, it becomes part of the wider recovery pathway rather than simply equipment sitting beside the bed.



[2] Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1 | New England Journal of Medicine

A different kind of shift

Now think back to that busy shift.

Instead of repeatedly crouching down to interpret an underwater seal drain, the healthcare professional has access to objective digital information.

The drain can be positioned so its information is easily viewed, and where clinically appropriate, the patient can mobilise without remaining tied to a wall suction point. So, when they need to move through the hospital, drainage can move with them.

That is a very different way to think about chest drainage.

Thopaz+ is still a chest drainage system. But its potential value is much wider than drainage alone.

It is about providing objective information to support clinical decision-making.

It is about mobility, workflow and continuity as the patient moves through different stages of care.

Bringing us to a much more interesting question:

"Where across the patient pathway could objective digital drainage support, clinical decisions, patient mobility and more efficient care?"

That is where the future of chest drainage becomes much bigger than the drain itself.

