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Conceptual Redesign of a Collapsible Mortuary Stretcher for Compact and Convenient Transportation

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ABSTRACT: Mortuary stretchers play an important role in the transportation of deceased individuals in hospitals, mortuaries and funeral services. Existing mortuary stretchers mainly focus on basic transportation but often face limitations in storage convenience, portability and adaptability during transportation. This study focuses on the conceptual redesign of a collapsible mortuary stretcher for compact and convenient transportation. The proposed design aims to improve portability, storage efficiency and ease of handling while maintaining structural support and practical usability. The redesign approach also focuses on reducing transportation difficulty in confined spaces and improving operational flexibility compared to conventional mortuary stretchers. The proposed concept provides a compact and practical transportation solution suitable for modern mortuary requirements.

KEYWORDS: collapsible mortuary stretcher, mortuary transportation, compact transportation, sectional collapsible frame mechanism, interlinked collapsible slat mechanism, collapsible support structure, mortuary equipment, portable stretcher system

I. INTRODUCTION

Mortuary stretchers are important transportation systems used for handling and transporting deceased individuals in hospitals, mortuaries, funeral facilities and burial transportation services [1]. These stretchers help in maintaining safe handling, transportation convenience and operational efficiency during body transfer procedures. Different types of mortuary stretchers are currently available in the market including folding stretchers, wheeled stretchers, scoop stretchers and hydraulic mortuary cots [2].

However, many existing mortuary stretchers occupy larger storage space and may create transportation difficulties in narrow pathways, compact vehicle storage areas and confined environments [3]. Conventional stretcher systems mainly focus on basic transportation functionality with limited emphasis on compact collapsibility and transportation convenience.

This study focuses on the conceptual redesign of a collapsible mortuary stretcher for compact and convenient transportation. The proposed design incorporates a sectional collapsible frame mechanism combined with an interlinked collapsible slat support structure to improve compact storage and transportation convenience to improve storage efficiency and portability while maintaining structural support during transportation. The redesign aims to provide a practical and compact mortuary transportation solution suitable for modern transportation requirements.

II. EXISTING MORTUARY STRETCHER SYSTEMS

Various types of mortuary stretchers are currently used for transportation and handling of deceased individuals in hospitals, mortuaries and funeral transportation services. The commonly available systems include folding stretchers, wheeled mortuary cots, hydraulic stretchers and scoop stretchers [4]. Folding stretchers are mainly designed for compact storage and temporary transportation purposes. Wheeled mortuary stretchers provide ease of movement during transportation inside hospitals and mortuary facilities [5]. Hydraulic mortuary cots are used for height adjustment and convenient loading during ambulance and mortuary vehicle transportation.

Scoop stretchers are designed to separate into multiple sections for easy body transfer with reduced handling movement. Some modern mortuary stretchers also incorporate collapsible structures and lightweight aluminium frames

to improve portability and storage convenience [6]. However, many existing systems still occupy larger storage space and may face transportation difficulties in confined spaces such as narrow corridors, elevators and compact transport vehicles.

Most currently available mortuary stretchers mainly focus on transportation functionality while limited attention is given towards compact collapsibility and adaptive structural design. Existing collapsible systems are also primarily based on folding fabric mechanisms which may experience structural sagging and reduced rigidity during extended use [7]. These limitations create the need for redesign approaches that improve compactness, portability and structural support within mortuary transportation systems.

III. LIMITATIONS OF EXISTING SYSTEMS

Existing mortuary stretcher systems mainly focus on basic transportation and handling applications within hospitals, mortuaries and funeral transportation services [8]. Although folding and wheeled stretcher systems improve portability to some extent, many currently available systems still occupy larger storage space during non-operational conditions [9]. Transportation through narrow corridors, elevators and compact transport vehicles may therefore become difficult in certain situations.

Many conventional collapsible stretchers also depend mainly on flexible fabric support surfaces which may experience sagging, reduced rigidity and structural instability during prolonged usage [10]. Some stretcher systems additionally require larger storage areas due to fixed frame dimensions and limited collapsibility mechanisms. Hydraulic mortuary cots and heavy-duty transport systems may also increase overall equipment weight and transportation complexity.

Existing telescopic and folding stretcher mechanisms are primarily designed for emergency medical transportation rather than compact mortuary storage applications [11]. Limited attention has been given towards sectional collapsible frame structures combined with rigid segmented support systems for mortuary transportation purposes. These limitations create the need for a compact, structurally supportive and conveniently collapsible mortuary stretcher system capable of improving transportation flexibility and storage efficiency.

IV. PROPOSED DESIGN AND CONCEPTUAL DEVELOPMENT

The proposed system is a compact collapsible mortuary stretcher designed to improve transportation convenience and storage efficiency. The conceptual design is based on a sectional collapsible frame mechanism combined with an interlinked collapsible slat support structure. The stretcher frame is designed using interconnected rectangular support sections capable of collapsing into a compact configuration during storage conditions.

The structural framework mainly consists of larger outer frame members and smaller connecting extension members arranged in a sectional telescopic configuration. During expansion, the interconnected frame sections slide outward to achieve the required stretcher length for body transportation. During collapse, the connecting members retract into adjacent frame sections to reduce overall stretcher dimensions and improve compact storage capability [12].

The body support region consists of interconnected rigid slat members arranged parallel to each other within the stretcher frame. These slat members remain closely arranged during collapsed conditions and progressively expand into a flat support surface during complete frame extension. During partial extension, the slat members remain in an inclined articulated arrangement before achieving a fully aligned flat support structure at complete expansion. This mechanism improves compact collapsibility while maintaining structural rigidity during operational use.

The proposed design also incorporates wheel support for transportation convenience and improved mobility. The redesign primarily focuses on achieving compact storage, simplified transportation and improved structural support while maintaining practical mortuary handling functionality [13].

Table 1: Comparison between existing and proposed design of stretcher

**TABLE I
COMPARISON BETWEEN EXISTING AND PROPOSED MORTUARY STRETCHER SYSTEM**

Parameter		Existing Mortuary Stretchers	Proposed Collapsible Mortuary Stretcher
1.	Storage Requirement	Requires larger storage space.	Compact collapsible storage configuration.
2.	Transportation Convenience	Difficult in confined transport spaces.	Improved compact transportation capability.
3.	Structural Support Surface	Mostly fabric-based support in collapsible systems.	Rigid interlinked slat support structure.
4.	Sagging Risk	Possible during prolonged use.	Reduced due to segmented rigid support.
5.	Portability	Moderate portability.	Improved portability.
6.	Frame Structure	Fixed or simple folding structure.	Sectional collapsible frame mechanism.
7.	Compactness During Non-use	Limited compactness.	High compact collapsibility.
8.	Wheel Arrangement	Usually fixed wheel position.	Integrated with expandable frame sections.
9.	Expansion Mechanism	Basic folding or telescopic mechanism.	Sectional telescopic collapsible arrangement.
10.	Operational Flexibility	Limited compact adaptability.	Improved storage and transport flexibility.
11.	Structural Load Distribution	Load concentrated in limited frame regions.	Load distributed across sectional frame regions.
12.	Ease of Handling	Moderate handling convenience.	Improved handling convenience.
13.	Prototype Manufacturing	Conventional design.	Modular sectional fabrication possible.
14.	Suitability for Narrow Corridors and Elevators	Limited in larger systems.	Improved compact movement capability.

V. WORKING PRINCIPLE OF THE PROPOSED STRETCHER SYSTEM

The proposed collapsible mortuary stretcher operates using a sectional telescopic frame mechanism integrated with an interlinked collapsible slat support structure. During storage conditions, the stretcher remains in a compact collapsed configuration in which the interconnected frame sections remain closely arranged with minimum occupied space. The slat support members also remain compressed together during this stage.

During operational use, the stretcher frame expands through outward sliding movement of the interconnected sectional members. The smaller connecting sections extend progressively from the larger outer frame sections until the required stretcher length is achieved. Simultaneously, the interconnected slat members gradually separate and align to form the body support surface [14].

During partial extension, the slat members remain in an inclined articulated arrangement. Complete flat alignment of the slat structure is achieved only after full frame expansion. This mechanism allows compact collapsibility during storage while maintaining structural support during transportation conditions [15].

The sectional frame arrangement also helps distribute structural load across multiple frame regions instead of concentrating the load on a single telescopic member. Wheels are attached to the expandable frame sections to improve movement, balance and easy transportation during mortuary handling operations [16].

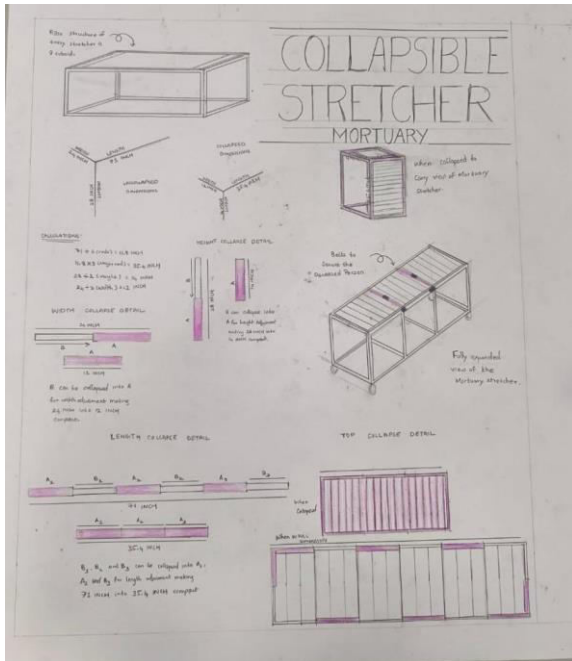


Fig 1: Conceptual sketch of the mortuary stretcher

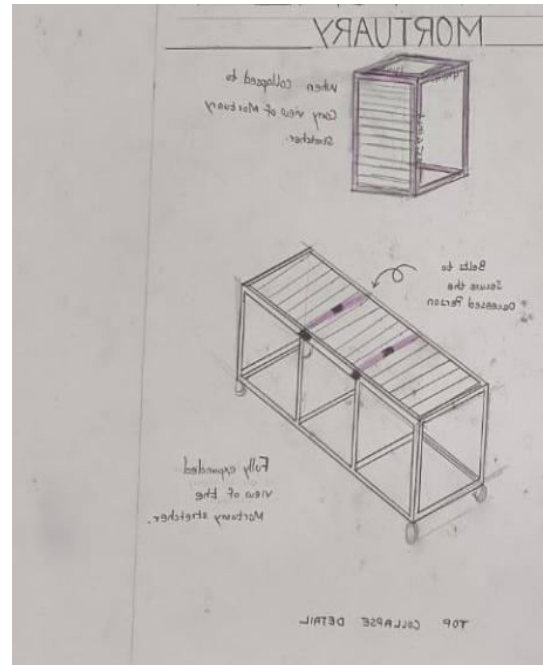


Fig 2: Fully expanded configuration of stretcher

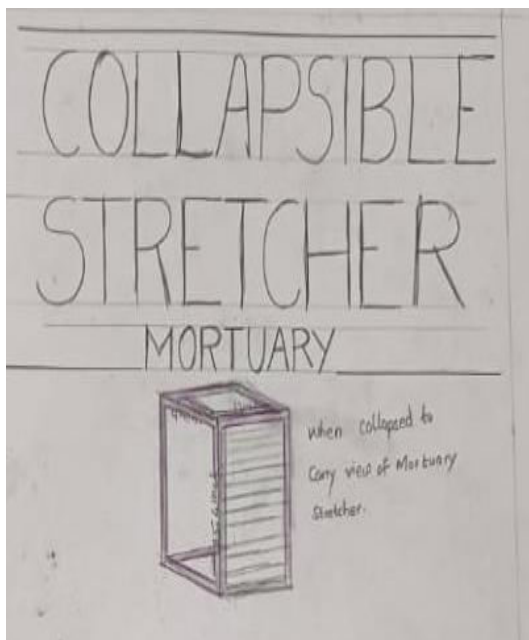


Fig 3: Collapsible configuration

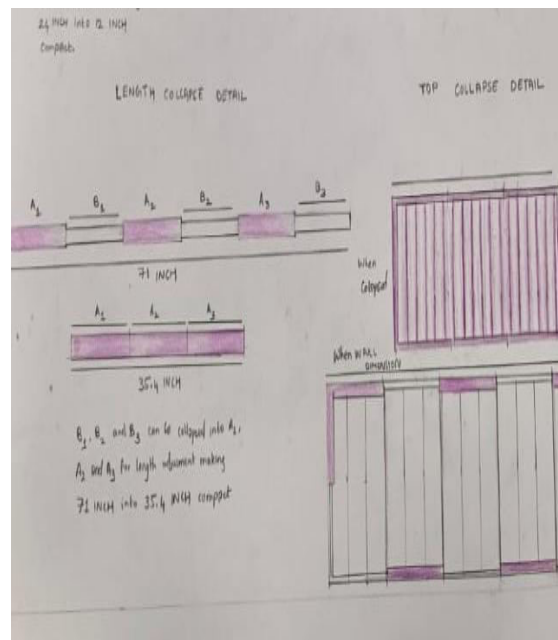


Fig 4: Sectional Telescopic Frame Arrangement

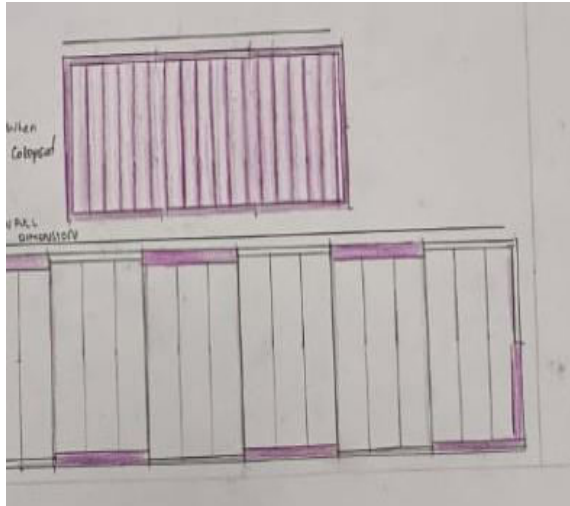


Fig 5: Interlinked slat support mechanism

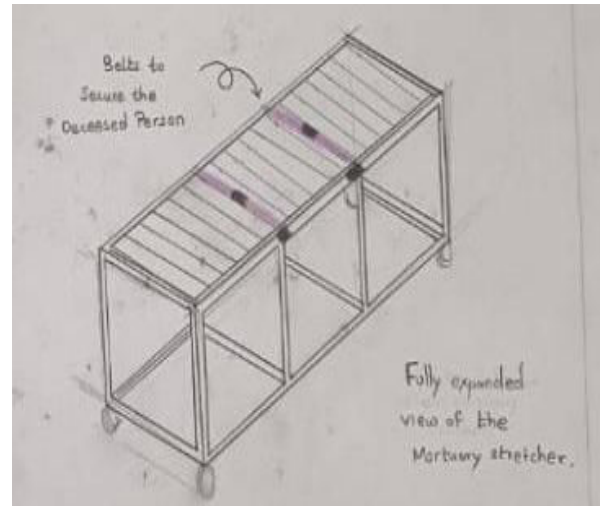


Fig 6: Wheel intergration on leg with expandable frame

VI. ADVANTAGES OF THE PROPOSED DESIGN

The proposed collapsible mortuary stretcher offers several advantages compared to conventional mortuary transportation systems. The sectional collapsible frame structure helps reduce overall storage dimensions during non-operational conditions, thereby improving storage convenience in hospitals, mortuaries and transport vehicles [17]. The compact collapsible configuration may also improve portability and ease of transportation through narrow corridors, elevators and confined transportation environments.

The interconnected slat support mechanism provides improved structural rigidity compared to conventional fabric-based collapsible stretcher systems [18]. The segmented rigid support arrangement may help reduce sagging and improve body support stability during transportation. The proposed sectional extension mechanism additionally distributes structural load across multiple frame regions, thereby improving overall mechanical support.

The design also supports simplified expansion and collapse operations while maintaining compact storage capability. Integration of wheels with the expandable frame sections further improves transportation convenience and operational mobility. The proposed redesign therefore provides a compact, portable and structurally supportive mortuary transportation system suitable for practical handling applications [19].

VII. CONCLUSION

This study presented the conceptual redesign of a collapsible mortuary stretcher intended to improve compact storage and transportation convenience during mortuary handling operations. The proposed design incorporates a sectional collapsible frame structure combined with an interlinked collapsible slat support mechanism to achieve compact collapsibility while maintaining structural support during transportation conditions.

The redesign mainly focuses on improving portability, storage efficiency and operational convenience compared to conventional mortuary stretcher systems. The segmented slat support arrangement may additionally improve rigidity and reduce sagging problems commonly associated with conventional fabric-based collapsible stretchers [20].

The proposed concept may provide a practical and compact solution for hospitals, mortuaries and funeral transportation services where space efficiency and transportation flexibility are important operational requirements.

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