

The Progression of Forensics and Transitional Justice within the Framework of Technological Advancements in the Justice System

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Abstract

The academic community has paid surprisingly little attention to the transformative impact that forensic science has had on the way in which nations deal with their violent history. This contrasts with the growing interest in institutional and normative aspects that promote global accountability. This research contributes to the current body of literature on transitional justice by drawing attention to the innovative but unappreciated role that forensic justice technology plays in empowering victims to pursue justice, responsibility, and human rights. Even though forensic technology has made it feasible to positively identify human remains for humanitarian purposes, strong evidence from exhumations is still required in order to bring those responsible for egregious violations of human rights to justice. Within the scope of this research, interviews were conducted with forensic specialists, judges, prosecutors, and lawmakers to gain an understanding of the ways in which these tools influence accountability in post-conflict environments. It provides an explanation of how transitional justice developed concurrently with the expansion of forensic tools for investigating possible violations of human rights.

Keywords: Forensic sciences, Transitional justice, Human rights, Accountability, exhumations

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Introduction

The summer of 2015 saw the exhumation and identification of the remains of two individuals discovered in a bog in the Irish county of Meath. During "the Troubles" in Northern Ireland, Republican paramilitaries allegedly kidnapped, murdered, and laid to rest Seamus Wright and Kevin McKee (Dempster, 2019). The forensic group ICLVR, which was established in 1998 as part of the peace process, is responsible for finding and identifying all of the "disappeared" people during the Troubles; they oversaw the exhumation. After decades of being unaware of the importance of this rite, families were finally able to prepare a proper burial thanks to the work of the ICLVR (Dempster, 2019; Khan & Jiliani, 2023).

Not only has Ireland done this, but so have other countries. The well-known Truth and

Reconciliation Commission (TRC) in South Africa expanded its mandate to include the pursuit of forensic truth when it formed a specialized forensic team to locate the almost 2,000 people who disappeared during Apartheid (Aronson, 2011; Wilson, 2001). In order to bring those responsible for the horrific atrocities perpetrated during the Balkan war to justice, the International Criminal Tribunal for the Former Yugoslavia (ICTY) has been using forensic evidence retrieved from gravesites since the mid-1990s (Wagner, 2008; Khan et al., 2021).

An independent intergovernmental organization with a worldwide purpose to strengthen global accountability procedures, the International Commission on Missing Persons (ICMP) has developed from the designated forensic group. All of this is a result of the extraordinary forensic capabilities that were created to meet the needs of the ICTY's prosecution. This tendency explains why forensic investigations are becoming an integral part of the UN's post-conflict efforts (UN, 2009, 2010; Usman et al., 2021).

International actors and national governments are increasingly depending on forensic "technologies of justice" to formulate transitional justice initiatives, which is a trend seen in many post-conflict nations. Despite these technologies' position on the global agenda for policymaking, little is known regarding their advantages and downsides. To rephrase, how have they affected, if at all, societal efforts to address the legacy of violence? For multiple reasons, it is critical to answer this issue satisfactorily. To start, the new legal system relies heavily on forensic techniques. Therefore, we need to consider how they will affect the development of accountability and transitional justice in the aftermath of conflicts. A second point is that forensic teams have been the subject of a great deal of study in the last ten years, mostly in the US (Ferrándiz, 2013; Robben, 2005; Rosenblatt, 2015; Sanford, 2003; Wagner, 2008; Khan et al., 2020).

These studies generally offer idiographic details about processes in particular contexts or places, however they are highly useful.² Theories and studies on how forensic justice technologies might transform post-conflict accountability are lacking. This study fills that need by outlining the four ways in which forensic technology has revolutionized contemporary transitional justice. Humanitarian exhumations are the first kind, and they involve the development of forensic tools to address the victims' humanitarian needs while still upholding their legal claim to compensation. In order to bolster investigations, forensic technologies can be used in truth recovery to piece together patterns of previous violations and document them.

Lastly, retributive justice includes procedures for recovering evidence from cemeteries to aid in investigations of crimes. I don't want to imply that people feel more responsible for the world now because of technological advances. Conversely, society now has more options than ever before to address long-standing problems, all thanks to its accessibility. For the first time ever, science may use technology to positively identify corpses or piece together crime

scenes with the use of "hard facts," eliminating any room for doubt, controversy, or ambiguity. Furthermore, the characteristics of technology grant policymakers a substantial amount of autonomy. With the versatility of forensic methodologies, policymakers can utilize them for prosecution, fact-finding, or humanitarian purposes, allowing them to tailor policies to the needs of different civilizations.³ Most studies have overlooked a similar "forensic cascade," even if normative, institutional, ideational, and other factors are important contributors to the "justice cascade" that has been shown in the last several decades (Sikkink, 2011; Khan et al., 2020).

Considering how widely used forensic tools are, this comes as a surprise. International accountability has been profoundly impacted by forensic technology, much like other areas of international politics that have been transformed by earlier technological advances. Notable social science research, especially on nationalism, has shown how technological progress can trigger major ideological or political movements. Print capitalism allowed for the emergence of nation-states and nationalism in Europe, as demonstrated by Benedict Anderson (1991). In 1981, Daniel Headrick showed how colonial powers employed "technologies of empire" to cement and expand their rule, and in 1982, Fernand Braudel detailed how technical progress triggered seismic shifts in the international monetary system. In all cases, technology played a game-changing role (Akaev and Pantin, 2014; Hussain et al., 2023). Similarly, forensic technology has transformed the growth of transitional justice and international accountability, in my opinion.

Forensic technologies and post-conflict accountability

Since the Cold War ended, experts in international politics have sought to explain why accountability is of paramount importance in post-authoritarian or post-conflict contexts. They make a valid point when they say that accountability systems utilized by post-conflict and post-autocratic states to deal with their violent histories are examples of how transitional justice policies have gone global.⁴ A phenomenon called the "Justice Cascade" has occurred, when leaders who were once considered "untouchable" are now often accused and even found guilty of human rights violations (Sikkink, 2011; Lutz and Reiger, 2009). Such transgressions were largely formerly "off the hook" for warlords and other autocratic leaders. Here are a few instances: the establishment of a permanent International Criminal Court (ICC), the establishment of interim international tribunals in Rwanda and the former Yugoslavia in the early 1990s, and the prosecution of notable individuals by national courts in Chile (Pinochet), Argentina (Videla), and Guatemala (Ríos Montt), among plenty of others. Changes in perspective and international factors have been attributed to this result in multiple research projects that date back to the 1980s (Keck and Sikkink, 1998; Sikkink, 2011; Khan et al., 2023).

Specifically, the rule of law and democratic ideals were touted as being safeguarded by

a new liberal global order. This perspective evolved so that safeguarding human rights became a matter of international supervision, which in turn made it more difficult for corrupt governments to get away with human rights violations and threw doubt on the assertions of sovereign nations (Moravcsik, 1995). This seismic shift increased the bar for national compliance and validated the global spread of international accountability standards, as pointed out by Appe (2016), Bob (2005), Brysk (1993), Powell and Staton (2009), Risse et al. (1999), Roht-Arriazza (2005), Sikkink (2011), Sikkink and Walling (2007), and others.

According to Kim and Sharman (2014), worldwide accountability follows in numerous areas of international politics, such as corruption and other forms of white-collar crime. Some states adopt elements of this culture as a result of their upbringing, while others do so in an effort to gain worldwide legitimacy and renown. Research on "transitional activist networks" (TANs) has demonstrated that when domestic groups and international human rights organizations, like Amnesty International, collaborate to generate a "shaming" effect, societies are more likely to hold individuals accountable for human rights crimes (Clark, 2001; Murdie and Davis, 2012). González-Ocantos (2016) notes that this procedure has the potential to gain the support of the court and other national institutional players. A crucial aspect of the process the availability of forensic tools to reconstruct the violent past has not been investigated, even though this literature offers a well-established and intuitive framework to comprehend the movement towards international accountability legislation. In times of uncertain political change, prominent figures on a global scale will reconsider their backing for criminal prosecutions (Cobban, 2007; Snyder and Vinjamuri, 2003).

In order to aid in criminal investigations, states and international organizations can now gather scientific data that is mostly incontestable. Nowadays, forensic science and genetics play a significant role in transitional justice and peacebuilding. On the other hand, their practicality and availability are considered as enabling factors in the larger justice chain. A thorough theoretical framework describing how these specific new technologies have changed current international responsibility is still lacking, despite the increasing amount of forensics-related academic work. Relevant case studies (Collins, 2018; Congram and Fernandez, 2010; Dempster, 2016; Robben, 2005), the expansion of prominent forensic communities (Crossland, 2013; Rosenblatt, 2015), and the application of forensic expertise in international tribunals (Nettelfield and Wagner, 2013; Wagner, 2008) have all been the subject of numerous interdisciplinary investigations.

Because no study synthesis has been conducted or these important findings have not been applied to a more general framework, our present knowledge of how these technologies have affected the transitional justice landscape is inadequate. Conflicts that arise as a result of international criminal tribunals' operations have also been the subject of research. The necessity to understand criminal motives in a broader historical context and the stricter

requirements for establishing guilt in a criminal trial are at odds with one other (see Subotić, 2014; Wilson, 2011). Historical truth, in its most basic sense, surpasses all forensic or legal evidence. Expert witness testimony is vital in this case to demonstrate the historical context of the crimes and to bolster legal claims (Wilson, 2011).

Conceptual framework

Accountability and technology are illusive ideas. Leo Marx (2010) claims that calling technology merely a “autonomous agent capable of determining the course of events” is “hazardous” when tracing its use as a historical notion (p. 928). Furthermore, stating that the effects of technology are “self-evident” is insufficient; empirical evidence is required. Marx and others (see Salomon, 1984) encourage us to distinguish between the rhetorical use of technology as a historical marker and the actual components of technologies (such as machinery and expertise). Based on this paradigm, I define forensic sciences and discuss how their diverse methods have influenced global responsibility in the sections that follow. “Forensics” refers to two primary domains: first, the physical forensic techniques used in investigations, such as DNA sampling, forensic dentistry, forensic radiology, and forensic genetics; and second, the expert testimony provided by anthropologists, archaeologists, geneticists, and human rights workers who gather evidence on the ground. When taken together, these instruments are vital for re-creating atrocities against human rights.

Technical and normative processes are both encompassed by the term “forensic technologies” in the same sentence. The first is the use of forensics as a “good practice” in post-conflict situations, overseen by international bodies and governed by international norms. The second is developing new avenues for post-conflict cultures to face their violent past through the use of targeted forensic techniques. These technologies offer worldwide credibility when discussing the past and can be easily customized by governments to fulfill specific needs. In a criminal investigation, for example, exhumations may be conducted just for humanitarian reasons or to bolster a prosecutorial strategy. Therefore, in post-conflict circumstances, forensic technologies can fulfill more than only the needs of punitive justice. While “forensics” is an ill-defined notion, “accountability” is a philosophical quagmire. Although scholars may disagree on the exact definition, accountability has been dubbed the “uber concept” of the modern era (Flinders, 2014).

The term “horizontal” describes procedures like audits and retributive justice, whereas “vertical” describes the way in which citizens scrutinize public leaders.⁵ Accountability and retributive/criminal justice are treated interchangeably in the literature on transitional justice. Nevertheless, this expression's intellectual underpinnings have received scant attention. The endeavor to explain what happened and reproduce the violent past without really punishing anyone is lost in the reduction of accountability to (individual) retributive justice.

Accountability does not have to revolve around criminal proceedings; for instance, it might reveal systemic human rights violations made possible by institutional flaws or it can document trends of violations. This essay presents my novel and flexible conceptual framework for accountability. I am solely concerned in accountability systems that employ "retrospective" or ex post facto approaches to try to find out who was responsible for past acts of violence. "Prospective" accountability measures that seek to control future acts by institutions or individuals are not something I think about.

The requirement for responsibility in post-crisis circumstances is typically retroactive, focusing on making sense of what happened, even if it is crucial to building conditions for sustainable peace and respect for human rights. The simple concept of "retributive justice," which seeks to identify and punish criminals, is at odds with my view of retroactive accountability. Even if it is not directly related to a criminal investigation, it encompasses any process of learning what transpired. According to this perspective, there are four significant ways that forensic technologies might assist societies in addressing accountability concerns (see Figure 1).

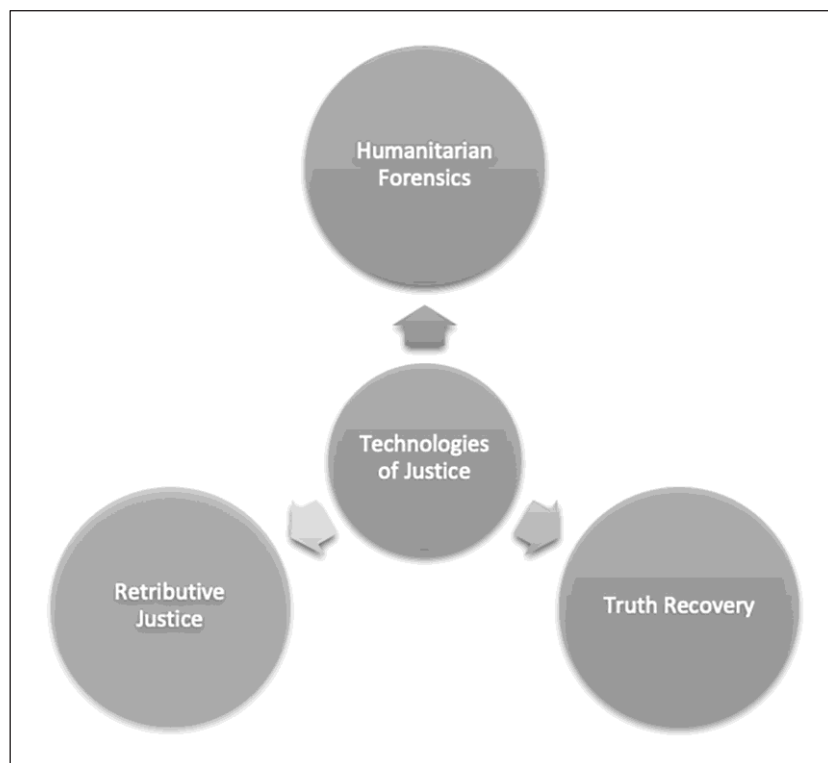


Figure 1: Transformative impacts of forensic technologies on transitional justice.

Humanitarian Forensics: Genetic testing and other forensic techniques have made it

possible to positively identify the bodies of victims of genocide (London et al., 2013; International Committee of the Red Cross, 2009: 9). When it comes to cases of hidden crimes, such disappearances, where people's remains are buried in public cemeteries and their relatives don't know what happened to them for a long time, this is crucial (Boss, 2006).

Not only may exhumations provide light on the circumstances (such as the cause and time of death), but they also provide a chance for families to reconcile and find closure. The finding of a body has given hundreds of families in war-torn countries like Northern Ireland, Cyprus, and Georgia the chance to start healing for the lost. This is a fundamental strategy for finding the truth and making amends, but it is essential. From an international accountability perspective, this provision can address multiple basic legal rights, such as the "right to know" the truth and the right to repair (Kyriakou 2014: 20; Scovazzi and Citroni 2007).

Truth Recovery: In order to document institutional failures or patterns of atrocities, official fact-finding bodies may employ forensic technology to piece together what happened in the past. Scientific and methodical past reconstruction has changed the way truth commissions work. Not only are these mechanisms easier, cheaper, and faster to set up, but they also have a better probability of accurately reconstructing the past. When dealing with situations of covert crimes, this becomes even more crucial. They rely heavily on forensic technology because their main duty is to write up a detailed report or description of what happened. International normative shifts and the rise of the right to truth have propelled these pursuits to the forefront since the 1960s (Schudson, 2015). Unfortunately, reliable technologies have increased the global requirement to "document" the truth.

Retributive Justice: The possibilities for post-crisis retributive justice have been transformed by forensic technologies. To put it briefly, science now possesses trustworthy instruments to offer proof that may be utilised in a court of law to raise the possibility of conviction for the first time. In significant ways, these technologies promote the idea of punishing those who are at fault. Prosecutors can now gather incriminating evidence from previously unreachable sources, which has aided them in their investigations of crimes with a high burden of proof. Second, the manner prosecutors present evidence in court has been impacted by the technologies. This is especially important for crimes that are very technical in nature, as the jury or even the judges may not be able to access the information.

There's a catch, though. According to this three-part concept, forensic technologies are merely a tool that can be used (or not); they are not the cause. Political demand is obviously required for accountability to thrive, especially in post-conflict environments; nevertheless, political appetite by itself might not be enough to provide a favourable result. In situations where there is a political desire to take action, the availability of these specific technology tools has enabled societies and international actors to address long-standing issues in fresh ways.

Research design

I followed these steps in order to trace the three paths mentioned above. I started by looking at all truth commissions that were established between 1982 and 2015 to see if they had a mandate that included a forensic investigation. I also conducted in-person interviews with forensic specialists who were employed by these commissions. Second, in order to investigate the scope of the work of all the major worldwide forensic groups, I added archive research on their publications.⁶ Third, I focused on analyzing Argentina's experience in depth so that I could recreate the historical foundations of using forensic techniques in truth commissions and trace the transformative impact of these tools on the global diffusion of truth commissions and forensic groups.

The most challenging aspect of the inquiry was determining whether and how forensic technology impact court rulings. How much of an impact do they have on police investigations? There were three reasons why the Argentina case was a good way to tackle this crucial issue. To begin, Argentina has an international reputation for producing excellent accountability outcomes. Even under the most unfavorable conditions of amnesty for offenders, Argentina was a pioneer in the struggle against impunity, as stated in the literature, long before other nations started reflecting on their violent past. Finally, theory and transitional justice have benefited much from the Argentinean experience (González-Ocantos, 2014; Sikkink, 2011).

Second, the secret nature of the crimes—including extrajudicial murders and disappearances—has placed the weight of proof squarely on Argentina's shoulders, making it an integral part of this investigation. The Argentine police had a very hard time investigating crimes and gathering evidence since the country lacked a *corpus delicti*, or body of evidence (Scovazzi and Citroni, 2007).

One of the most challenging parts of investigating disappearances and extrajudicial murders in post-conflict settings is finding the remains of victims, recreating their treatment before death, and finally identifying the person or people responsible for their passing. Thirdly, Argentina may be emblematic of a more widespread regional trend in a region that is highly consequential in transitional justice, since it was a key antecedent to transitional justice processes in other Latin American nations. Finally, it appeared that zeroing in on the most pertinent case—Argentina—and doing a comprehensive analysis was the way to go when faced with such an incredibly complex subject. A robust alternative might be a global comparison research looking at how forensic technology relate to conviction rates. But that would just show if these technologies are statistically associated with different conviction outcomes; it wouldn't solve the whole topic. I was more worried about increasing trust in the results' internal validity by employing contextually sensitive methodologies to identify specific

causal mechanisms that underpin the changing influence of forensic technology on criminal cases (Mahoney, 2004; Pepinsky, 2019).

A two-pronged strategy based on within-case comparison studies (Collier, 1993; Gerring, 2004) allowed me to do this. I started by looking at Argentine court cases to see how much weight prosecutors give to evidence gathered using forensic technologies. Court decisions in fifty cases with different levels of reliance on forensic expertise were examined using official data from the prosecutor's office (for more details, see Section 5.3). The goal of the analysis was to determine whether forensic expertise⁷ had any impact on the outcome (conviction or acquittal). On the other hand, judicial rulings don't tell the whole story; it would be difficult to document the extent to which the judges' reasoning was affected by the presence (or absence) of forensic technical evidence. In order to tackle this issue, 19 interviews were carried out with key figures in Argentina who have direct experience with similar circumstances. Since interviews aid in determining the direction of causal processes, they are crucial to process tracing (González-Ocantos, 2020).

In essence, the semi-structured approach provided a means of demonstrating the "objective" influence of forensics on the process while also enabling participants to express their personal perspectives on the matter. Professional competence (as judges, prosecutors, or forensic experts) and degree of engagement with the cases were factors in our methodical selection process. (Refer to McEvoy, 2019 for further information on selective sampling). Forensics' impact on verdicts was examined by conducting in-depth interviews with and analyzing the reasoning of the judges who rendered verdicts in these particular cases. One of the most important ways to find out whether forensic technology affected the way judges and prosecutors investigated and prosecuted cases was to interview them. As a last point, forensic experts shared their deployment stories and gave their expertise.

Forensic pathways to international accountability

Humanitarian forensics

The last 30 years have seen the rise of forensic technologies as an integral part of investigating and understanding the past. Using DNA evidence, the bodies of those who have been victims of clandestine abuse can be located and given back to their loved ones (ICRC, 2009: 9; London et al., 2013). In cases where the victim's remains are deposited in a public cemetery, "humanitarian" exhumations become extremely important, as is the case in cases involving disappearances. In the past, eyewitness testimony was crucial to positively identifying these bodies; however, these individuals were often the perpetrators of the crimes they were trying to cover up, and so were understandably reluctant to give any information that could accuse them. Hundreds of families of the missing were left in a state of "ambiguous loss" (Boss,

2006) from Georgia to Northern Ireland, Chechnya to Cyprus. According to Kovras (2017) and Robins (2013), without an acknowledged body and a suitable burial, families are unable to start grieving or find closure. The offenders were the only ones with any chance of breaking this cycle of pain, but they also lacked the will to do so. This was painful even for societies that were generally accepting of change, such as South Africans and Chileans (Aronson, 2011).

Forensic methods have reduced the conflict on a personal and societal level. More than seventy-three percent of the missing's relatives and eighty percent of the population in Bosnia and Herzegovina agreed that humanitarian forensics help with reconciliation in a 2014 survey (International Commission for Missing Persons (ICMP), 2014: 117). There may not have been a political settlement to the "Cyprus problem" (1963–1974), but the two communities on the island have worked together with forensic teams to address the disappearances (Hadjigeorgiou, 2022).

"A model of successful cooperation" and a tool for creating "trust and promote reconciliation that are crucial for long term peace" are the words used to describe the Committee on Missing Persons (CMP) by former UN Secretary General Ban Ki Moon (Loizides, 2016: 8). For some other reason, humanitarian forensics is necessary to comprehend the concept of international accountability. Unfortunately, there are situations where exhumations are required to satisfy the legal entitlement of victims or their relatives to "know the truth." Per the 2007 International Convention for the Protection of all Persons from Forced Disappearance (art. 24 para. 2-4) and the United Nations' "Basic Principles and Guidelines" (Mallinder, 2008: 179-180), state agencies must "take all appropriate measures to search for, locate and release disappeared persons and, in the event of death, to locate, respect and return their remains" (art. 24.3).

This ensures that families of the disappeared can exercise their right to reparation. Forensic exhumations in post-conflict contexts may involve witnesses or perpetrators, who typically consent to cooperate in return for confidentiality and protection from prosecution. However, under art. 6, the state is obligated to prosecute offenders, and art. 3, which requires the state to conduct a thorough investigation, frequently conflicts with art. 6, which protects individuals' privacy. Communities reestablishing themselves after a battle have used state-of-the-art forensic instruments to differentiate between the "duty to prosecute" and the "right to know." The "right" of victims to know the truth can be satisfied by exhuming the remains of victims of violence for humanitarian reasons alone, without necessarily punishing the offenders. Return to truth Access to forensic technologies is vital for the global growth of truth commissions, a fundamental aspect of transitional justice, in examining human rights atrocities. Documenting human rights breaches that occurred during periods of violence, conflict, or state persecution is an ex post facto obligation for truth commissions (Bakiner, 2014; Hayner, 2010; Wiebelhaus-Brahm, 2010).

They are authorized to conduct investigations with the intention of acting out violent scenarios. They typically issue a final report that admits the realities about the violent past.

Worldwide, conflicts between 1974 and 2015 led to the establishment of 44 truth commissions (Kochanski, 2020). The public at large now appears to believe that these are effective methods of promoting accountability (UN, 2006). According to Argentinean literature, truth commissions were first established in the 1980s as a "compromise" approach; subsequent democracies in Latin America replicated this practice. Punishing criminals or military personnel would be a dangerous way to disrupt the fragile democratic transition (Kritz, 1995).

Some sort of responsibility was unavoidable, nevertheless, because of the tremendous mobilization of the victims' families to publicly convey their sorrow and demand the truth about the state's involvement in the murders. Because of the prevalence of amnesties, truth commissions emerged as a means by which the public might hold offenders to account (Neier, 1999). This description omits two important aspects of the genesis of truth commissions. First, truth commissions were set up during a specific historical period in Latin America to address a specific set of hidden crimes, such as extrajudicial murders and disappearances, perpetrated by dictatorships. Second, as forensic technology developed, their prevalence increased. Forensic science and truth commissions are mutually beneficial. Given the prevalence of abductions and other covert crimes in Latin America, it is not surprising that most of the first truth commissions were established there (Robben, 2005).

The "deniability" of the crime is called into doubt by forensics, despite the fact that it let families positively identify their loved ones (Author, 2017). As the first of its kind in Argentina, the National Commission on the Disappearance of Persons (CONADEP) was tasked with more than just locating the missing; it was also to record additional human rights violations and expose the military's complicity in these crimes. According to the final report of the truth commission, the military administration primarily employed three terror methods (CONADEP, 1984). According to Robben (2005), planes allegedly administered medications to thousands of inmates before dumping them over the ocean while they were still alive. Community graves were marked with N/N (ningun nombre/no name) to signify that the bodies of the victims were laid to rest there (Robben, 2005).

Third, *asadito*, or "little barbecue," was a typical practice in rural areas; it entailed shooting victims before they were burned, typically in tires. Victim identification was made impossible because these procedures did not leave any proof. Because of all the forensic processes used to find these artifacts, Argentina was the "big bang" for the invention and subsequent global distribution of forensics (Rosenblatt, 2015). As far as we are aware, this truth commission was the first of its kind to employ forensic specialists. Despite forensic science being in its early stages in the 1980s, the increasing utilization of forensic evidence was driven by victim families' desperation to discover the truth about their loved ones. Finding their daughters' remains and, in circumstances where it could be shown that they had given birth before their execution, reuniting with their missing grandchildren were the top priorities for the grandmothers during that period (Arditti, 1999; Rosenblatt, 2015). Because of the public's

insistence on knowing what happened to the missing, Ernesto Sabáto, president of CONADEP, officially asked AAAS members to use their expertise to help find the bodies of those buried in mass graves (NN) (Cholakian and Guglielmo, 2017).

Clyde Snow and Eric Stover, two of the most prominent US forensics specialists of the 1980s, went to Argentina in 1984 with CONADEP on an inquiry (Stover and Joyce, 1991).8. EAAF gained a reputation as a top forensic squad in following investigations into human rights crimes. As a result of EAAF's activities with violently affected cultures around the world, humanitarian attempts to identify remains and piece together violent histories are now significantly more effective. By visiting jails and filming detainees, its members chronicle criminal behavior, including torture. When the Argentinean EAAF trained forensic experts and helped other Latin American nations establish their own forensic teams to address challenges stemming from their own violent histories, it set off a chain reaction throughout the region. The Latin American Forensic Anthropology Association (ALAF) and the countries of Guatemala, Chile, and Peru are among these (Juhl, 2005: 25-30).9.

As a result, a network of forensic experts was formed, which improved the capacity of national fact-finding missions to collect evidence of human rights abuses. Reconstructing patterns of violence is essential for investigative truth commissions to carry out their duties, and this could not have been accomplished without the EAAF and national forensic teams in general. Table 1 shows the correlation between the proliferation of truth commissions around the world and the accessibility of forensics. Depending on the situation, the first year in parenthesis denotes the date of truth commission adoption, while the second year in parenthesis shows the year of exhumations, if appropriate. On the left side of the table are the nations that established truth commissions that included forensic investigation specifically. The right column of Table 1 lists the commissions that did not involve exhumations, denoted by an asterisk. The connection between forensics and truth commissions from 1982 to 2015.

Truth commissions with forensic investigation	Truth commissions without
Forensic investigation Argentina (1983–1983)	Algeria (2003)
Brazil (2011–2012)	Bolivia (1982)*
Canada (2008–2009)	Burundi (1995)
Chile (1990–1991)	Chad (1994)
El Salvador (1992–1992)	DR Congo (2003)*
Grenada (2001–2003)	Kenya (2008)
Guatemala (1997–1998)	Liberia (2006)
Haiti (1995–1995)	Morocco (2004)

Honduras (1993–1994)	Nigeria (1999)
Nepal (2015–2015)	Philippines (1986)
Panama (2001–2002)	Rwanda (1999)*
Paraguay (2004–2005)	Sri Lanka (1994 and 2015)
Peru (2001–2001)	Uruguay(1985)* Serbia (2002–2002)
Sierra Leone (2002–2002)	
Solomon Islands (2008–2010)	
South Africa (1995–1997)	
South Korea (2003 and 2005–2005)	
Timor (2002–2002)	
Uruguay (2000–2001)	

EAAF: ICMP: Argentine Forensic Anthropology Team, International Committee of the Red Cross, and International Commission for Missing Persons are the coordinating bodies. Information on truth commissions was culled from the USIP Truth Commission Digital Collection and Kochanski (2020). Forensic expert interviews, the ICRC, Physicians for Human Rights, the EAAF, and the ICMP are some of the places where we get our information about exhumations.

Note: An asterisk (*) is placed next to the name of a country if it had an exhumation after the commission was established. After the committee was formed, exhumations were conducted. From the operation itself (left column) to its aftermath (right column, indicated with an asterisk), the majority of commissions utilized forensic technologies to bolster their broader investigational efforts, as seen in the table. The extraordinary ability of multinational forensic organizations to provide the "facts" required to meet the increasing global demand for truth recovery is really a major debt that truth commissions should be grateful to. You could say that forensics has legitimized truth commissions, but you could also say the exact opposite. Over the past forty years, forensic groups have reaped substantial profits from the increasing number of truth commissions and global criminal investigations. Starting in the 1980s with commissioners established in Latin American governments, EAAF has collaborated with international commissions in several nations, including Haiti, South Africa, El Salvador, and others, to acquire knowledge in post-conflict contexts (Interview No. 1).

There are a number of international forensic organizations that commissions around the world use, including the ICRC, the ICMP, and PHR, among others. As a result, a forensic epistemic community emerged, capable of exchanging knowledge gained from previous

engagements with other groups and conflicts with emerging commissions worldwide (Interview No. 12). Truth commissions around the nation will have more access to their investigative services as these groups gain prominence and experience. Many national and international groups now support the initial policy proposal to form a commission due to the high probability that it will be "effective" in its designated function. Forensic investigations have long been a truth technology, and truth commissions' widespread popularity has proven this. Additionally, truth commissioners have traditionally benefited from the availability of forensic methods. In conclusion, exhumations and truth commissions complement one other.

Retributive justice

González-Ocantos (2016), Kim (2012), Sikkink and Walling (2007), and Sikkink (2011) are among the transitional justice experts who have studied the justice cascade, or the surge of human rights prosecutions during transitions. Justice Cascade, written by Kathryn Sikkink, lays out the important history of the new accountability norms that have been pushed forward by legal and normative procedures. But there's one important thing she doesn't mention: how science may unearth irrefutable evidence from graves to bring killers to justice. If we want to comprehend the justice cascade, we have to recognize the simultaneous forensic cascade that changed the way governments dealt with their violent past and punished those responsible. The mere presence of legal norms does not ensure that they will be applied or provide positive outcomes. In countries like Argentina and Chile, where victims have used similar legal mechanisms to bring offenders to justice, there is an unsuccessful case for every successful one. Take Cyprus as an example; despite pursuing daring legal strategies—including taking matters to the European Court of Human Rights—for decades, nothing came of it. Credibility is mostly gained in the pursuit of accountability when forensic evidence is used to support a court case. Since then, the justice system has relied heavily on forensic justice technologies.

However, this connection is multi-faceted; as seen earlier, forensic methodologies were able to gain traction in new contexts thanks to the emergence of new standards and general shifts in norms. Coexisting, the technological and normative processes each pave the way for the other in ways that neither could have imagined. First, forensics helps the prosecution gather evidence that could incriminate the dead; second, it helps the prosecution present the evidence in court in a scientific, unquestionable, and easily understandable way; and third, it increases the likelihood that a judge will find sufficient evidence to support a conviction, all of which contribute to retributive justice. Following this, I will do a methodical analysis of this process, focusing on Argentina as a prime example. tactics for legal action. According to Argentinian prosecutors involved in human rights processes and other knowledgeable people I spoke with, forensic technology is used to gather evidence in criminal cases. Since the burden of proof lies in establishing guilt, it is of the utmost importance to determine the

identities of the victims and the circumstances surrounding their deaths. Take Argentina's "stolen babies" (chicos perdidos) as an example.¹¹ Hundreds of young women were executed after their incarceration. Catholic principles were upheld by the foster homes where their children were put, which were often other military families (Arditti, 1999).

Often, grand-paternity was the only way to prove kidnapping when the parents' generation was missing (Interview No. 12). It may be possible to determine that the mother gave birth while imprisoned using forensic evidence recovered from her grave, such as her pelvis. Consequently, the prosecution's case relied heavily on DNA evidence and information regarding the family prior to the tragedy. "Restoring the identity of the bodies is crucial information; without technology it would have been impossible to obtain it," stated an experienced judge who made a verdict in one of those cases (Interview No. 9). More than 10,000 individuals and 300 families seeking relative information have their blood types, genetic markers, and histocompatibility recorded in the National Genetics Data Bank, making it an invaluable resource for kidnapping cases (Interview No. 8). The expeditious, precise, and easy identification made possible by forensic evidence also helped in criminal investigations. An Argentine judge who decided on multiple human rights issues claims that DNA has revolutionized crime solving around the world. Recent years have seen the Argentine National Genetics Data Bank make extensive use of state-of-the-art technology [...]. In the past, it would have taken a long time or blood samples to verify someone's identity. The use of genetic material from a toothbrush as proof of identification was ultimately as simple as obtaining a search warrant. Technology allowed us to make the most of our investigation time. (Interview Number 7).

Forensics helped in criminal investigations by giving new life to cases that couldn't have been prosecuted without it. At the time of the crimes, certain forensic seeds were planted and then used to build fresh cases. For example, public medical pathologists conducted preliminary examinations on the bodies of those who had been victims of what became known as "staged confrontations" before they were laid to rest. According to an Argentine prosecutor with extensive expertise in cases involving military crimes, this evidence was used to show a pattern in the crimes' reasoning: The criterion is that the files contain a reasonably reliable record from the period of the facts. Thanks to them, we have been able to reconstruct cases and press charges in tens of cases involving these tragedies. Valid, accurate data is used to generate the reports. Interview No. 3 As stated in Interviews No. 14, No. 17, forensic evidence is now essential for testimonial testimony in court, in addition to demonstrating the commission of a crime and identifying the victim (corpus delicti). The first rulings in the 1986 trial of the Junta demonstrate that testimonial testimony was the primary piece of evidence for certain kinds of crimes that are committed in complete secrecy and cannot be traced, since there was no paper trail to document covert crimes like kidnappings.

This was the case in human rights prosecutions in Argentina. There are cases where witnesses are considered essential. The secrecy surrounding the repression, the offenders' anonymity, and the purposeful destruction of documents and traces all provide credibility to these accounts. (Ruling 309: 319, 1986, Trial of the Judiciary) From this vantage point, the prosecution frequently included findings from the National Genetics Databank and the EAAF into their case strategy because of the vital evidence they offered. These groups are trusted by courts and prosecutors because of their stellar reputation, says an experienced prosecutor (Interview No. 6).

Equally important in linking the defendant to the time and/or location of death were forensic technologies. Since it is just as important to determine who ordered the act, witness testimonies that place defendants at the site of the crime are frequently insufficient. On the other hand, forensic technology can investigate any paper trail that may exist. For example, in order to restore files that have been modified by security services, archival specialists may provide invaluable support. It was very helpful in Argentina for verifying the legitimacy of police or military files to apply forensic document inspection analysis, since this can show flaws in papers that are typically imperceptible to the human eye. Given that a prosecutor's office specialist had described an incident in which the Argentinian intelligence corps had falsified documents to hide evidence of wrongdoing (Interview No. 5), it was critical to establish the genuineness of the erased file. The chain of command and the people giving the instructions could be revealed by analyzing military communications, such as the army's radio broadcasts from that time. A "smoking gun" does not necessarily have to be present for DNA or other forensic instruments to be revealed. Research has shown that forensics can be harmful in criminal procedures, and there have been warnings about the "CSI effect" and the creation of "unrealistic expectations" about the burden of proof (Cole and Dioso-Villa, 2009).

To put it plainly, forensic science has provided new tools for prosecutors to investigate and potentially prosecute crimes that were previously extremely difficult, if not impossible, to do so. Forensic experts' testimony is crucial for these reasons; one defense attorney I spoke with put it thus way: "For the judges, they are the Bible, and not even the defendant It was very helpful in Argentina for verifying the legitimacy of police or military files to apply forensic document inspection analysis, since this can show flaws in papers that are typically imperceptible to the human eye.

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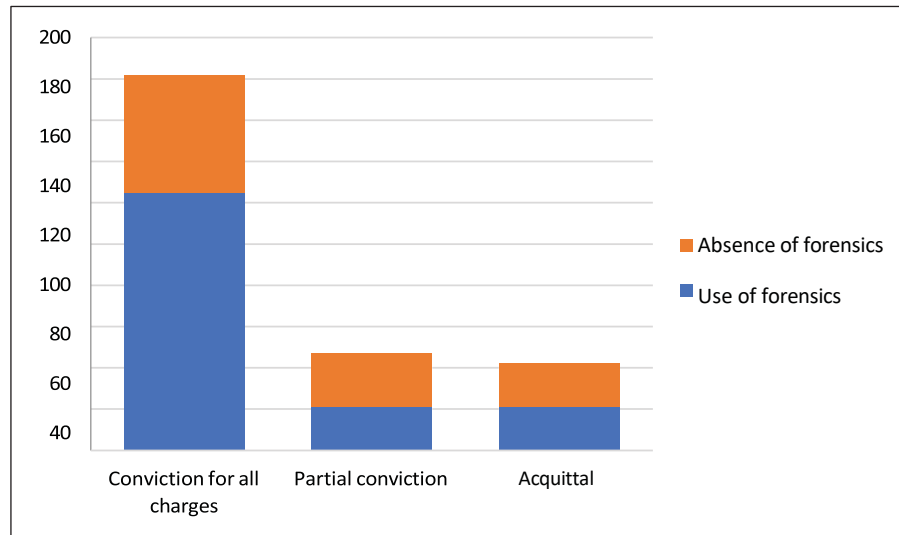
science, prosecutors now have new resources at their disposal, including the ability to provide judges with technically sound but easily digestible proof of wrongdoing. One seasoned prosecutor in human rights cases said that prosecutors "could not do it alone" due to the complexity of these processes. For court proceedings, they need to know the ins and outs of the crime and be prepared to explain the technical details to the judge "one or a hundred times if necessary" (Interview No. 6).

Because a judge would not be able to process the volume of data or the intricacy of the crime without the use of visual representations of evidence, which have greatly helped prosecutors present powerful evidence in court. As per an expert witness with extensive background in human rights trials, judges' perceptions of these instances have evolved due to "seeing the evidence" (Interviews No. 2, No. 4). As an example, software for topography reconstruction has been developed by a collaboration between computer scientists and architects. These techniques have made it possible to rebuild damaged or destroyed correctional buildings while simultaneously giving the judge a visual representation of the crime. To reconstruct clandestine prisons, a group of architects and computer scientists established a non-profit called Memoria Abierta (open memory). It makes it possible to connect the dots between abduction sites and the "repressive circuits" that must be rebuilt when combined with georeferencing tools. Once ten to fifteen trustworthy witnesses have been included to the reconstruction, the judge can see their evidence through a virtual tour (Interview No. 2).

According to the court players involved, prosecutors have been able to (essentially) reconstruct crimes and affect the outcome, even though this does not provide a smoking gun. It was the statement of one judge, "We are able to connect the facts with the physical space and establish with certainty where each part of the clandestine detention centers was located" (Interview No. 3), that impacted the choices of the other judges. After reviewing a selection of Argentinian court cases to determine the impact of forensic technology on the likelihood of criminal culpability, I investigated the logic behind the ultimate verdict. While doing this, I compared 271 cases that were chosen at random from the court system; 229 of these cases led to convictions and 42 to acquittals. In 167 (62% of the total) of such cases, forensic instruments were employed. Graph 1 shows the several types of rulings (full conviction, partial conviction, and acquittal) and the cases where forensics were used (or not used) by the prosecution.

The graph clearly shows a correlation between forensic evidence and the likelihood of a guilty verdict. The use of these tools increased the likelihood of a guilty conviction, whereas their non-usage increased the likelihood of an acquittal but kept the odds of a guilty verdict constant.

Graph 1: Court decisions and the use of forensic science in criminal investigations (based on an examination of 271 decisions supplied by the Argentina Public Prosecutor's Office).



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There are cases where witnesses are considered essential. The secrecy surrounding the repression, the offenders' anonymity, and the purposeful destruction of documents and traces all provide credibility to these accounts. (Ruling 309: 319, 1986, Trial of the Judiciary) From this vantage point, the prosecution frequently included findings from the National Genetics Databank and the EAAF into their case strategy because of the vital evidence they offered. According to a seasoned prosecutor, these groups have such a great reputation that judges and prosecutors have faith in them (Interview No. 6). Forensic technologies played an equally crucial role in connecting the defendant to the time and/or place of death. Witness accounts that put defendants at the crime scene are often inadequate since determining who ordered the crime is equally crucial. On the other hand, forensic technology can investigate any paper trail that may exist.

For example, in order to restore files that have been modified by security services, archival specialists may provide invaluable support. Since forensic document inspection analysis can reveal imperfections on documents that are often invisible to the naked eye, it proved highly useful in Argentina for confirming the authenticity of military or police files. Since an expert from the prosecutor's office recounted a situation where the Argentinian intelligence corps fabricated documents to conceal evidence of illegal activity (Interview No. 5), it was crucial to prove the authenticity of the deleted file. An examination of military communications, such as the radio broadcasts made by the army during that period, could potentially reveal the command structure and the individuals responsible for issuing the orders. A "smoking gun" does not necessarily have to be present for DNA or other forensic instruments to be revealed. Research has shown that forensics can be harmful in criminal procedures, and there have been warnings about the "CSI effect" and the creation of "unrealistic expectations" about the burden of proof (Cole and Dioso-Villa, 2009).

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Lessons from the forensic cascade

The success and international growth of transitional justice initiatives have been greatly aided by forensic technologies. Without forensic technologies, certain "restorative" or "retributive" actions would not have been feasible. However, this is rarely brought up in the literature. For instance, as I indicated earlier, Sikkink provides valuable insight into the legal and normative mechanisms that give rise to new standards of accountability; however, her analysis fails to examine a crucial element in the justice cascade: the capacity to convict criminals based on undeniable evidence from graves. Without taking note of the forensic cascade, it is hard to completely understand the justice cascade. Different countries have used forensic techniques in different ways.

As discussed in Interview No. 2, forensic sciences have effectively differentiated between humanitarian exhumations and any criminal process in instances of negotiated transitions or "frozen conflicts" including the urgent legacies of covert crimes. Humanitarian exhumations have allowed thousands of families in Georgia, Northern Ireland, Cyprus, and Colombia to find closure without fear of legal repercussions. To facilitate the provision of protections such as anonymity, secrecy, and immunity to both criminals and witnesses, it is customary in legal systems to keep these two processes apart. However, as shown in Rwanda, Argentina, and Guatemala, forensic evidence has been utilized by other nations to rein in amnesty laws and ensure that criminals face justice. Numerous prominent international organizations, like the ICC, ad hoc criminal tribunals, and the United Nations, have utilized forensic technologies of justice in response to the retributive agenda's unique effects (UN, 2009).¹⁶ A primary objective of forensic technologies of justice study is to comprehend the intricacies of victim rights, state legal obligations, and the practical limitations of life in post-conflict or post-authoritarian contexts.

Scholars have long argued that, in light of amnesty legislation, society should put an emphasis on stability and peace rather than on confronting the past (Cobban, 2007; Vinjamuri and Snyder, 2004; Kim, 2012; Sikkink, 2011). Efforts to promote fairness and preserve harmony under uncertain times are seen to be incompatible. This is usually the case, but as we'll see below, advancements in forensic science have made it possible to distinguish between these two vital objectives in relation to specific crimes.

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